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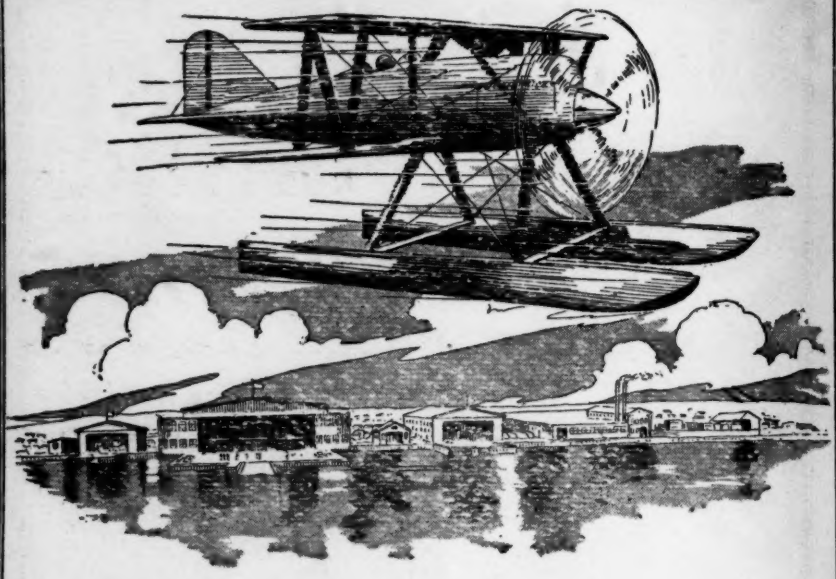

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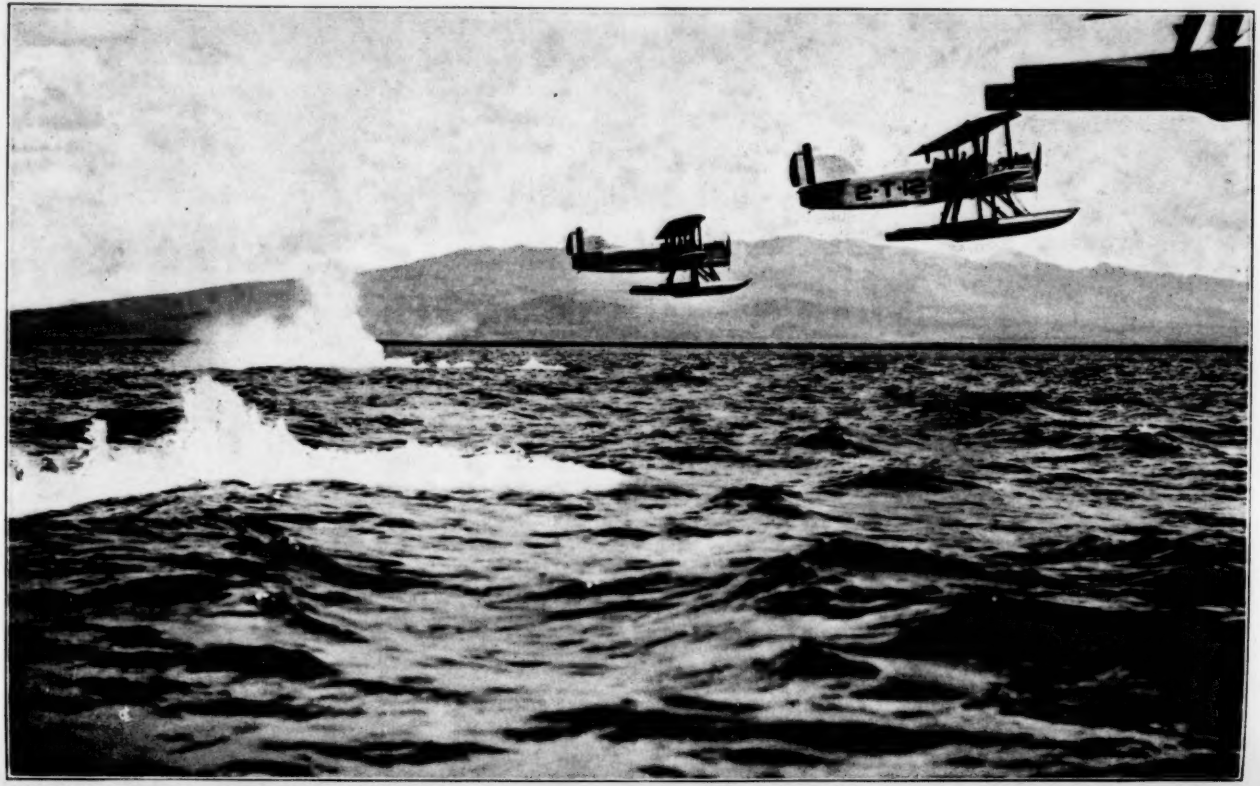

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TORPEDO PLANES DROPPING TORPEDOES IN A MANEUVER ATTACK OF THE BATTLE FLEET

UNITED STATES NAVAL INSTITUTE PROCEEDINGS

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TACTICAL EMPLOYMENT OF NAVAL AIRCRAFT

BY LIEUTENANT COMMANDER H. B. GROW, U. S. N.

FOREWORD

THE purpose of this article is not to offer any set of hard and fast rules that must be followed, but merely to present a discussion of the possible ways in which naval aircraft may be used, and a few suggestions as to the best manner in which to employ this important arm of the fleet in war time. It is fully realized that there will be some who do not concur with the writer's opinion, but it is hoped that the resulting differences of opinion will be the cause of discussions and arguments, the outcome of which will be a lively interest in the problems presented and perhaps a solution for some of them.

There is no past history to refer to, nor is there much previous war experience on which to base any conclusions. It is true, aircraft were employed to some extent with the British Fleet during the war, but no action took place, nor was any extensive mission executed in which aircraft were reconized as an integral part of the fleet and used as such. There can be no doubt, however, that in future wars any fleet of which a strong, well drilled air force forms a tactical unit, indoctrinated in fleet tactics, will have an enormous advantage over its adversary.

OPERATIONS OF AIRCRAFT

The operation of naval aircraft divides itself into two major classes: operations afloat or with the fleet, and those conducted

Official Navy Photo Aircraft Squadrons Battle Fleet

TORPEDO PLANES DROPPING TORPEDOES IN A MANEUVER ATTACK OF THE BATTLE FLEET

from naval districts; and the following discussion will be divided into two sections along these lines. Those operations with the fleet are considered by far the more important, and will be discussed more in detail, for the simple reason that ample information exists and ample experience has been had in operations from bases; while operations with the fleet are still in the experimental stage and offer a much greater field for discussion.

Aircraft Squadrons of the Fleet

It might be well, before discussing the employment of fleet aircraft, to discuss briefly the aeronautical organization afloat. This organization, in peace time, is limited by the size of the allowed fleet as approved at the limitation of arms conference. The fleet is divided into three main subdivisions: namely, Battle Fleet, Scouting Fleet, and Fleet Base Force. Assigned to each of these forces are a certain number of aircraft squadrons, known as the Aircraft Squadron, Battle Fleet; the Aircraft Squadron, Scouting Fleet, and the Aircraft Squadron, Fleet Base Force.

At present, of course, these units are separated by the peace time employment of the fleets, but it is reasonable to assume that in event of war the fleet will be concentrated, which will result in a certain number of *VF, VO, VT,* and *VS's* being available. The organization is very definite and is about one-third completed at the time of writing. It is being filled up as rapidly as planes and personnel become available, and is sufficiently permanent to permit of use in discussing the question of employment.

Work with the fleet will automatically resolve itself into four phases, which will be discussed in turn: First, the fleet concentrated at a base, such as Hawaii; secondly, cruising intact at sea and prior to contact with the enemy; thirdly, after contact but prior to the engagement; and finally, during a major engagement, by which is meant the engagement between the two main bodies, or battle lines.

Operations When Concentrated at a Base

The manner in which aircraft of the fleet would be used under the above conditions depends entirely upon the local defenses available under the naval district commandant. Should the naval district forces be sufficiently strong amply to patrol the

Plane Landing on Flying Deck of the "Langley"

coast and lines of communication, to scout against enemy advance, and to defend the base against submarine attacks, it should be the policy to retain the fleet aircraft on their ships, engaging only in such flying as is necessary to keep pilots and material in first class condition and to carry out drills and exercises; such as communication drills for spotting planes, bombing and torpedo exercises for the *VT* Squadrons, and gunnery training for the fighters. The fleet squadrons should, in other words, be relieved from any work in connection with the aerial defense of the base where they are located or patrol of the adjacent waters, and should be free to conduct such training and tactical exercises as will perfect them for use as part of the fleet, except that in case any part of the fleet should engage in a mission such as scouting or patrolling, the aircraft assigned to the unit occupied should function with them.

It is conceivable that under some conditions the fleet might be based at some point for which no local air defense is provided. Should this be the case, the commander-in-chief would then be justified in employing his aircraft on defensive and offensive patrols and on scouting and screening missions. It should always be remembered, however, that when the fleet goes into action, every plane and every pilot should be ready, and squadrons of the fleet should never be used at other times in missions which might impair their usefulness or reduce their strength.

The writer, therefore, believes that it is safe and proper to adopt the policy that when the fleet is concentrated at a base during war, the aerial defense of that base is a function of the mission of the naval district and not of the fleet, unless the aerial forces of the district are inadequate for such defense.

Operations When Cruising at Sea

When cruising with the fleet at sea, the primary use of aircraft would be scouting, either independently as a separate scouting force, or as adjuncts to light cruisers, submarines or other craft. The various chapters in "Service of Information and Security" incorporate the use of the airplane in scouting and the various methods outlined in these chapters are sound and possible, although experience has now shown that aircraft can be navigated with practically the same accuracy as ships, with practice, and it

is believed that they can be relied upon successfully to carry out scouting missions, even to the extent of using a retiring search in good weather. No effort will be made herein to state in detail how aircraft will be employed on their various missions.

The Use of Carriers

It has been suggested that the carriers might be used as part of the advancing scouting force, but due to the fact that the fighting, bombing and observation planes carried thereon will be urgently needed during a major engagement, the writer is of the opinion that the carriers should be with the main body and behind or part of the defensive screen. There may be conditions, of course, where the enemy is known to be of marked inferiority or is known to have no air forces present, in which the carriers may be disposed differently, using them as advanced scouts, striking force, or part of the screen. But if the air strength of the enemy fleet is anywhere near that of ours, the carriers should be retained within the screen, and close to the main body. From this position, the fighting planes can repel any air attack on the main body, providing a reasonable warning is received from the screen. These assumptions are made, of course, on the present approved organization. It is quite possible that there may be more carriers with the fleet, in which case it would be highly desirable to place one or two with the advance scouts, some in the screen, and two with the main body, but as long as our fleet contains only two large carriers, on which are based those squadrons so essential to success in a major engagement, it is believed that the proper place for these two carriers is with the main body and not more than fifteen miles in the rear, so as to enable them to be on the disengaged side of our main column when it finally deploys for action. It certainly would be disastrous for the two carriers to find themselves three hundred miles from the main body with the advance scouts when a major action was developing on the flank.

It must be remembered that one of the greatest efforts in future sea engagements will be to draw the enemy aircraft into the air. It is reasonable to assume that every time our air forces are launched there will be a certain wastage, and an enemy will doubtless by small demonstrations, long before the engagement,

attempt to make our fleet use its air forces excessively and continuously, thereby causing wastage and final fatigue. There would be great danger with our carriers in the screen or well in advance, of these efforts to draw us out being successful in no small degree. I do not believe that it will be possible to prevent aerial reconnaissance on either side in spite of air superiority. Visibility is so great from the air and a single plane so difficult to detect at twenty miles distant that each side is almost sure to have continual benefit of aerial reports. It would seem much better to accept this now as a fact, and conserve our forces prior to the engagement, rather than expend them in a useless effort to drive off a few reconnaissance planes which will have made their reports before being detected. It certainly is more important that we have absolute control of the air immediately prior to and during the main engagement, so that we may enjoy the enormous advantage of aircraft spotting, at the same time denying it to the enemy, and so that we may, for the period of the battle at least, conduct bombing, gas, screen, and torpedo attacks unmolested by the enemy fighters. It is for this reason that I advocate retaining the large carriers with the main body and using with the scouts and screen only such aircraft as may be on vessels in those units.

Naturally, should we find ourselves with more than two large carriers we might be justified in disposing of them in the screen or with the advance scouts, only on the condition, however, that there remains with the main body an air force superior to the whole air force that the enemy is able to put in the air.

Strategical and Tactical Training

With the organization of the fleet as now approved, and with the carriers a part of the main body, there remain to participate in strategical and tactical scouting those aircraft based on the scouting force; battleships, light cruisers, and submarines.

The purpose of strategical scouting is to gain information as to the location, strength, disposition, course, etc., of the enemy main body and screen. The first step after contact is a concentration of scouting ships and then to determine whether or not a screen has been located and finally to pierce the screen. It is during these operations that the aircraft from scouting vessels

A torpedo plane flying through an aircraft-laid smoke screen during recent battle practice off the coast of Southern California. These planes can attack through smoke screens without being seen by the enemy until too late for defense against them.

can and would be used. Visibility is so great on good days that a plane would hardly more than have to take off to locate any large group of vessels within forty miles. It is impossible to distinguish types at that distance, but this is not necessary during the first phase, and the mere knowledge of their presence would be invaluable were the airplane prevented from penetrating close enough to get more detailed information at that moment.

As the main bodies come closer the screens will clash, and the use of aircraft will increase. It is at this point that aircraft should make a decided effort to penetrate as near to the enemy main body as possible, and the struggle for control of the air will doubtless commence at this time, although we must be sure to retain with the main body a superiority. For this reason there should be with our screen, if they exist, one or more aircraft carriers, carrying fighting and observation planes, the former strongly to escort the latter in their effort to make contact with the enemy main body. These carriers must be in addition to those at present allowed in the fleet. This does not justify placing one of the big carriers in the screen, but indicates the need of more carriers than we now have.

As the engagement between the two main bodies becomes more and more imminent, strategical scouting merges into tactical scouting, which is merely a continuation of the supply of information concerning the enemy main body in order to assist the commander-in-chief to dispose his force to best advantage. During these operations aircraft carried on vessels in the defensive screen would be used or, were carriers present in excess of the two now allowed, planes from these carriers can also be used.

The Major Engagement

As soon as the main body is in striking distance, our aircraft will be required to execute the following missions:

1. Destroy enemy observation planes;
2. Tactical scouting;
3. Spot our own fall of shot;
4. Protect our own spotters;
5. Bomb and torpedo attacks on main body and carriers;
6. Gas attack on screen laying;
7. Mopping up.

To accomplish these we must have local control of the air and maintain such control during the period of the engagement. Control of the air will be obtained by the fighting squadrons, of which sufficient number must be available at commence fire and must not have been previously wasted or exhausted.

It might be said here that the confidential nature of war plans prevents a detailed discussion of the squadrons that would probably be employed, and their disposition. It will suffice to say that during the period of the main engagement we must have absolute control of the air; we must drive off every enemy spotter and protect our own, and must be prepared to launch bombing or torpedo attacks from our carriers in addition to a continuance of tactical scouting. This means we must establish protective patrols and send out offensive ones, remembering at all times that the battle may out-last the endurance of the planes originally sent out and we should be prepared to keep the air clear of the enemy until the engagement is definitely settled.

Concerning the possible use of the *VT* Squadrons, the writer is of the opinion that these weapons can be used most effectively just at the opening of the engagement, and afterwards for "mopping up." In fact, one squadron should be retained in reserve ready to launch attacks on any ship of the enemy force that may be partially disabled but still afloat. I should employ these squadrons as follows: Immediately prior to commencing fire, launch a vigorous torpedo plane attack against both bows of the enemy van, using one *VT* Squadron for this purpose; at the same time launch another *VT* Squadron in two flights, one flight carrying heavy bombs, the other gas bombs. The first flight will bomb enemy van and return to the carrier. The second flight will, immediately upon seeing the torpedo attack completed, lay a toxic gas screen across the enemy's course. Other squadrons should be retained in readiness to take off in divisions and carry out torpedo attacks on disabled enemy ships or ships trying to escape. From that point I believe that the torpedo plane attacks should be confined to "finishing off" vessels partly damaged and out of the formation but still dangerous, or to concentration on enemy carriers. In fact, the most attractive target, to my mind, would be enemy aircraft carriers, and I believe they should be

given first consideration even over battleships. This seems like putting one's neck in a noose, but the most effective method of eliminating any danger or trouble is to destroy the source of the danger and the destruction of enemy carriers will be, to my mind, of the most importance in future warfare even to the extent of perhaps deciding the engagement.

It must be remembered in reading this article that the purpose has not been to dictate any set procedures to be followed, but to offer a discussion on and suggestions for the solution of a problem on which little accurate information exists and the answer to which can not be based on any past experience. For once we can not study history and the actions of great leaders for our own edification. True, certain principles exist in aerial combat, some work was done with torpedoes and bombs, and we have done excellent work in spotting, but to no source can we turn for any experience in working out our plans for the co-ordination of tactics of air units operating with the fleet.

Operations of District Craft

Little will be said concerning the operations of aircraft from shore bases. The mission of a naval district includes escort, convoy, and patrol in the waters under its jurisdiction.

There is at hand a vast amount of information concerning the most effective manner in which to carry out these missions. Airships can go farther to sea with convoys and can remain in the air longer than airplanes; they also can cruise with a convoy. On the other hand, airplanes, once an enemy submarine is sighted, stand a much better chance of bombing it successfully on account of their greater speed in getting to their objective. It would seem that for convoy work each district should employ both airships and airplanes.

The defense of the coast against enemy air raids falls to the Army Air Service and hence there remains for us the duty of scouting and patrol.

To insure the absence of an enemy from the entrance to any port at daybreak, it will be necessary to insure his absence at sunset of the evening previous from any point 225 miles from that port. The most effective way to accomplish this is to con-

duct a radial patrol from the base, the courses of the scouting planes diverging by such an amount that when the 200 mile circle is reached the distance between scouts will be about fifty miles.

It is customary on long cruises at present to send aircraft in pairs for mutual protection and assistance. This, for the present, should be continued until the power plant becomes absolutely reliable.

Planes should leave the base at such time as to just be starting their homeward journey at dusk, which procedure will detect any enemy in the territory searched and will insure his not being able to arrive off the port at daybreak if not discovered during the search.

A CRUISE THROUGH THE FIRST ACADEMIC JOURNAL, AND SOME MODERN ANALOGIES

By Lieutenant Commander Mahlon S. Tisdale, U. S. Navy

IN A small glass showcase built especially for the purpose, in the Academic Board room at the Naval Academy, is a brown, leather-covered, dog-eared volume which, in longhand entries, contains the early history of the Academy—from 1845-54. None but the very young scoff at tradition. It is inconceivable that one could browse through this record of the early struggles of our *alma mater* without feeling a stir of intense interest and gratitude to those men whose foresight and devotion to the service made the present great Academy possible. One who loves the institution will be interested in its history. All want to know when the 4.0 was born, who wrote the first regulation book and what was in it, who was the first commandant of midshipmen, the name of the first practice ship, and countless other things not common knowledge among the younger generation, but all of which are recorded or referred to in this old book.

In 1800, when the Secretary of War was seeking legislation for the establishment of what in 1802 came to be West Point, he included a "school of the navy" as one of the four subheads of his proposed Military Academy. This is doubtless the earliest record of an expressed need for a naval school. It is history that the West Point of 1802 included no nautical department.

From then until 1845, there was constant agitation for legislation authorizing a naval school, but the ears of Congress were consistently deaf.

Mr. George Bancroft, upon becoming Secretary of the Navy in 1845, inherited this deplorable situation along with the rest of his job. Himself an educator, he had a ready understanding of the Navy's need. Remedial legislation had failed repeatedly, and he realized that whatever was to be accomplished had to be

through other means than an appeal to Congress. Accordingly, on June 2, 1845, when a board of officers was ordered convened at the Philadelphia Naval Asylum, Mr. Bancroft broadened its precept to include a report concerning the advisability of establishing some sort of a school, as well as the usual report required from examining boards for the promotion of midshipmen.

His letter to the board was writen in Washington on June 13, 1845.

Sir:

I desire the assistance of your board in maturing a more efficient system of instruction for the young naval officers. The opportunity which your present arduous and responsible duties as examiners of the school affords you of giving practical and useful advice leads me to solicit your co-operation by as full a communication of your opinion as is consistent with your convenience.

Fort Severn has been recommended to me as a more suitable place for such a school than the Naval Asylum, especially as a vessel could be stationed there to serve as a school in Gunnery. The present term of instruction is too short. Might it not be well to have permanent instruction and to send all the midshipmen on shore to the school? What plan of studies is most advisable? I hope your board will find time, and be disposed to aid me by their suggestion * * * *

On June 25, 1845, the board made their report to the Secretary. They first discussed the proposed location at Fort Severn, and then, on the assumption that that or some other suitable location would be adopted, wrote:

It would be very desirable that a grade of naval cadets inferior to that of midshipman should be created by law, who should compose the primary classes of the Naval School, and from which all appointments of midshipmen should be made after the candidates for such appointment had passed through a stated course of elementary professional education. * * * *. These candidates should be appointed in the same manner as those at West Point and their pay, over which they should have no control, should be only sufficient to clothe and feed them. Twenty dollars per month would be adequate. * * * *. But whether a grade of naval cadets may or may not be created by law, a naval school such as it is proposed to recommend would operate equally to the advantage of the acting midshipmen as now appointed; the difference would lie only in the designation and pay of the existing and proposed grades. * * * *.

The report then considered what personnel would be needed, and went on to recommend that a practice ship be attached to the school. It then continues:

Having thus given a plan of the entire establishment of the school both

ashore and afloat, and supposing it to be authorized and ready for operation, the undersigned would recommend that all persons, who may from time to time be appointed to the Navy * * * * shall be required to enter the primary class. * * * *. First, after their appointments to the Navy, they should be required to remain two years attached to the primary school, at the expiration of which periods they may receive their warrants as midshipmen * * * *. From the primary school they should proceed as warranted midshipmen, to a sea-going ship, remaining at sea constantly for three years.

At the end of this first cruise they were to be attached to the practice ship for at least one year, when they were to be finally examined for a commission. It was then recommended that, as the system at West Point had operated most happily, the naval school be organized along similar lines. The next mention covered two points which throughout the years have kept all midshipmen wondering—the semi-annual examinations, and the Academic Board. This is the first reference to either. In referring to the examinations the report has this to say:

By making the final examinations of primary students extremely strict, both in regard to moral conduct and academic improvement, none but the meritorious will find their way into the Navy.

The board concludes its report by offering to serve on a further committee should the Secretary so desire.

Soon after this record was received in the Department, the Secretary visited Annapolis, presumably for the inspection of Fort Severn and its environs.

Shortly after this visit another board was appointed to consider the subject in detail. Among the members of this body was Commander Franklin Buchanan, U. S. Navy, destined to become the first Superintendent of the school. This board decided upon Annapolis as the place, and upon three of the Navy's most experienced teachers as instructors—Lieutenant J. H. Ward, U. S. N., and Professors Chauvenet and Lockwood of the Naval Asylum. Later, in a letter to Commander Buchanan, the Secretary stated some of his own views on the school:

In carrying this design into effect it is my desire that all unnecessary expense be avoided, to create no place of easy service, no commands that are not strictly necessary, to incur no charge that may demand new annual appropriations, but by a more wise application of moneys already appropriated and officers already authorized, to provide for the better educa-

tion of the young officers of the navy. It is my design not to create new offices, but by economy of administration to give vigor of action to those which at present are available; not to invoke new legislation, but to execute more effectually existing laws. Placed by their profession in connection with the world, visiting in their career of service every climate and leading people, the officers of the Navy, if they gain but opportunity for scientific instruction may make themselves distinguished for culture as they have been for gallant conduct * * * *

In collecting them at Annapolis for purposes of instruction, you will begin with the principle that a warrant in the Navy, far from being an excuse for licentious freedom, is to be held a pledge for subordination, industry, and regularity, for sobriety and assiduous attention to duty. Far from consenting that the tone of discipline and morality should be less than at universities or colleges of our country, the President expects such supervision and arrangements as shall make of them an exemplary body of which the country may be proud. * * * * The posts to which you and those associated with you will be called are intended to be posts of labor, but they will also be posts of the highest usefulness and consideration. To yourself, to whose diligence and care the organization of the school is intrusted, will belong, in good degree, the responsibility of a wise arrangement.

On August 14 Commander Buchanan "feeling sensibly the importance of the trust" replied to the Secretary, enclosing with his letter the first "Plan of the Naval School" which was no more nor less than the first regulation book. This was later modified somewhat, until on August 28, 1846, with the approval of the Secretary, it was printed as the official "Plan." This pamphlet contains much of interest. Unfortunately, space is not available for its reproduction.

On August 15, 1845, Fort Severn was transferred to naval jurisdiction by general order. And on the same day Commander Buchanan assumed charge.

The original organization, as had been foreseen, was soon to prove its undesirability from an educational viewpoint; but none better could be had without Congressional action. Despite its faults, the plan was monumental if for no more than the expressed idea of educating officers for the Navy.

The first entry in the first journal of the first board is a letter from Commander Buchanan written at the Naval School on October 4:

You will convene as a board and arrange the classes of midshipmen attached to the naval school, decide upon the hours of recitation, the

number of hours necessary to be applied to study, etc., * * *. The course of instruction will be comprised under the following heads: Mathematics, Natural Philosophy, Chemistry, Gunnery and the use of Steam, Geography, English Grammar, Arithmetic, History, the French and Spanish languages, and such other branches desirable to the accomplishment of a naval officer as your judgment may dictate. Lieutenant Ward will act as president of the board.

The board rendered the required report two days later, and, on the tenth of the month, the school was formally opened.

Fortunately the first Superintendent was a man of great courage and strength of character. A command is always the mirror of its commander. A weakling at the outset would have been a serious handicap to the infant institution. That the passing years have made small change in the worth of the advice given in his opening address shows his vision and his understanding of the magnitude of the undertaking.

Those among you who have served several years in the navy know the value of wholesome law and regulation; and to you I look with confidence for assistance in impressing upon the minds of those youths who have lately entered the service the absolute necessity of obedience.

The Government in affording you an opportunity of acquiring an education, so important to the accomplishment of a naval officer, has bestowed upon you all an incalculable benefit

The regulations of the navy require you to pass through a severe ordeal before you can be promoted; you must undergo an examination on all the branches taught at the naval school before you are eligible for a Lieutenancy; your morals and general character are strictly inquired into. It is therefore expected that you will improve every leisure moment in the acquirement of a knowledge of your profession; and you will recollect that a good moral character is essential to your promotion and high standing in the Navy.

By carefully avoiding the first step toward intemperance, shunning the society of the dissolute and idle, and by cherishing a wish to deserve and the hope of receiving the approbation of your country, you alone can render yourselves able to occupy with honor the high standing in the Navy to which many of you are destined. * * * * I shall deeply regret to hear that any individual among you has brought disgrace upon himself or upon his associates.

Every indulgence consistent with the rules and regulations of the institution will be granted to those who merit it. The laws of the Navy point out the punishment of those who violate orders; and no commander is justified in overlooking offenses against those laws, however painful it may be to him to enforce them. * * * *

It is at all times an unpleasant duty to a commander to be compelled

to punish misconduct of his juniors; but as omission on his part to do his duty makes him as culpable as the offender himself, no officer who feels a proper respect for the service or himself will subject himself to so unpleasant a situation. We have no right as individuals to do that which may involve others in our misfortunes; and when we, as naval men, intentionally violate the laws that govern us, we cannot without dishonor to ourselves expect to escape punishment by making others responsible for our crimes.

Below is the personnel of the first Academic Staff—the name still used at the Academy.

Commander Franklin Buchanan, U. S. N.—Superintendent.
Lieutenant J. H. Ward, U. S. N.—Executive, and Instructor in Gunnery and Steam.
Surgeon J. A. Lockwood, U. S. N.—Instructor in Chemistry.
Chaplain G. Jones, U. S. N.—Instructor in English.
Professor H. H. Lockwood—Instructor in Natural Philosophy.
Professor W. Chauvenet—Instructor in Mathematics and Navigation.
Professor A. N. Girault—Instructor in French.
Passed Midshipman S. Marcy—Assistant Instructor in Mathematics.

In June, 1846, the first annual examination was held. In the first printed regulation book on file at the Academy—from the inscription apparently Commander Buchanan's personal copy—are found the "rules to govern examinations at the naval school." These include provision for a system of weights and multiples not unlike those used today, for the section room mark being the basic mark, for the assignment of class standing to establish relative rank, for marking on a scale of ten, for what in effect was turning a midshipman back a class, and for the dropping of rejected midshipmen. As the record rather amusingly puts it:

An officer who shall be rejected will be dropped from the Navy list and returned to his friends.

The granting of a ten-day leave period at Christmas, which the present Superintendent has revived, was in effect from the opening of the naval school until 1849 when it was reduced to two days.

In 1846 Secretary Bancroft wrote:

The department is determined to do all in its power to encourage habits

of frugality and strict honor in pecuniary transactions, and consequently to discourage a disposition to incur debts beyond the means of punctual payment.

His successor wrote in similar vein and directed that no midshipman be allowed to visit a "tavern, hotel, or eating house" without permission. The instructions of the examining board of June, 1846, directed that any midshipman having unpaid debts "should be considered as having failed to pass." History is merely repeating, for an earnest campaign against the incurring of debts by midshipmen is still being conducted. Among other satisfactory but less important results, the three banks of Annapolis have gone on record in writing against the lending of money to midshipmen. No longer can a first classman, about to graduate, look to these banks for funds with which to liquidate his graduation debts. It is a logical deduction that with the closing of this source of funds there will be less credit given the midshipmen by firms engaging in that sort of business.

On October 5, 1846, Commander Buchanan issued an order to the board which indicates that a year of experience had shown room for improvement in his original plan:

Gentlemen:

The time is fast approaching when a large number of midshipmen will assemble here to pursue their studies; and as the experience of the last year's instruction convinces me that the program of studies can be changed advantageously to the midshipmen and the service, you are directed to convene on Monday the fifth instant for the purpose.

Natural Philosophy is an important branch of education to make an *accomplished* naval officer; but as the school was established with a view to make useful, practical officers *first*, I wish that branch confined principally to Mechanics, and illustrated as far as possible by experiments.

Practical Navigation and the use of nautical instruments I wish taught the junior class at the commencement of the course; the principles can be taught them later.

It is very important that the English branches should receive due consideration * * * *

There is an analogy in the statement of the present mission of the Academy that "fundamentals" shall be taught, and that graduates ought to have "practical rather than academic minds." These expressions differ only in terminology from Commander Buchanan's ideas. His opinion has weathered the storm of time and many administrations.

It was also in 1846 that the board resolved that:

> No midshipman shall address any professor upon the subject of his marks except with permission of the Superintendent.

This resolution has struggled along in various forms from regulation book to regulation book, and as a matter of fact has been only recently a subject for discussion.

The earliest of the plans required an examination at midyear. Through all the passing years, with only a few exceptions as during the recent war, the semi-annual examinations have continued to awe the midshipmen. The present year finds both the semi-annual and the annual examinations abolished in an endeavor to relieve some of the congestion of an overcrowded curriculum. This change gains some forty per cent of time for advanced work. It will not make the course less difficult—perhaps the contrary.

In the plan of August 28, 1846, it is stated that:

> Classes will be arranged according to the acquirements and capacity of the midshipmen.

It is interesting that sectioning classes has been adopted for this year (1923). Sectioning seems the answer to the axiom that the speed of the fleet is that of the slowest ship.

In the minutes of February, 1847, it was resolved,

> to invite the President and professors of St. John's College * * * to attend the examinations.

On October 25, 1923, the Superintendent represented the Naval Academy at the inauguration of the new President of old St. John's.

Later in the year 1847, the board met to submit the first compilation of marks and class standings which appears in the journal. The record goes on to say:

> that every individual's knowledge in each branch has been judged by combining proficiency exhibited during the examination with the opinion of his instructors based on their daily experience * * * *.

The combining of examination marks with the daily "opinion of his instructors" is today standard practice.

These same minutes explain the weights of the various subjects as:

> expressing the degree of labor devoted to the subjects respectively, and in their comparative importance in an elementary education.

Mathematics, French, and English were set at three each. Chemistry was assigned a weight of one. Using these weights, a class of twelve acting midshipmen was arranged according to their final multiples. Thus, our first merit roll. It differs only in size and detail from those of today.

The first suspension of the usual routine for what was no doubt called "An-week" is mentioned on June 21, 1847, when Commander Upshur, who had relieved Commander Buchanan, wrote:

> I am officially informed that the examination of midshipmen for promotion will be commenced on Monday next * * *. You will therefore * * * suspend the usual routine of lectures and other academic pursuits.

The minutes of June 21, 1847, are the first to mention any one as being deficient. On that date, one Fitzhugh was found "deficient in all branches."

On July 5 of this same year there is the first mention of the length of time set aside for the semi-annual examinations. The five hours mentioned have been assigned for the purpose ever since.

The original regulation book provided that "the Superintendent will frame a code of rules for the internal government . . ." There has been no change in this rule. Article 10 is the father of study hours, for it says that "during the hours appropriated to study the midshipmen are directed to confine themselves to their rooms for that purpose, and are not permitted to lounge or promenade about the grounds of the institution." Article 11 states that a "conduct roll will be kept by the Superintendent . . . to embrace all improprieties committed at the school—such as neglect of duty, insubordination, ... All serious offences will be reported to the Secretary of the Navy . . . ." There has been no change in this procedure. Article 13 confined midshipmen to the academic limits for punishment, which still is done. Article 14 invented the first Midshipman-in-charge-of-room, although it called him "Superintendent-of-room." Room-mates shifted this detail weekly as at present. The prohibitions as to changing rooms without authority, introducing intoxicating liquors into the reservation, cooking in rooms, and having meals there, originated in 1846 and today are unchanged.

One interesting clause that has not found need of duplication says that "chewing tobacco in the mess and recitation rooms is positively prohibited."

The midshipman officer of the day (now, of the watch) first appeared in article 22 of the 1846 "Plan"; although in those days he was virtually officer of the deck with much authority.

Last year there were some cases of carelessness in signing the hop liberty book. As far back as 1846 the liberty book was to be "regarded as an official record, exhibiting faithfully each officer's return to the institution."

The department of Marine Engineering and Naval Construction, at present the largest of the departments, had a rather humble beginning in those days of sailing ships. Steam was first an appendage of gunnery and the marks for the two were combined. In the minutes of October 11, 1847, covering a meeting "for the purpose of taking measures for the reopening of the school" among other resolutions is one that in the "opinion of this board instruction in the nature and the use of steam may properly be included in the course on Chemistry and it is therefore respectfully suggested to the Superintendent that the courses and steam be assigned to the same instructor."

The minutes mentioned next above are the first not signed by Lieutenant Ward, as President. Professor Chauvenet, whose name is so interlocked with the early history of the Academy, was elected as the second President and was re-elected each year until 1850, when the new plan which made the Superintendent President, ex-officio, became effective.

International Law makes its first appearance in 1847 when it was decided that "a lecture * * * on International Law is to be delivered once in two weeks in the place of a lecture on Chemistry or Steam."

On November 6, 1847, it was resolved that "candidates for admission at the school shall hereafter be examined by the board, three members thereof forming a quorum" and on November 10 the first candidate under this system, a Mr. Jones, was found "not qualified."

By 1848 the weights of the subjects had been changed to three for Navigation and Mathematics, and two each for French, Me-

chanics and Astronomy, and Gunnery and Steam. The aggregate "of the products thus obtained is taken as the index of academic standing."

As early as 1848 the board met to consider the evils attending the method of entering the naval school. The major evil is given as "the candidates come dropping in through the whole year." At short intervals also come orders detaching them, sometimes singly, sometimes in bodies of three or four." A committee was appointed late in the year to recommend changes in the method of admission.

The subject of the right requirements for entrance is still, and will continue to be, both vital and active.

The committee of 1848 referred to above presented a plan which was adopted December 20, 1848, and which two members of the board were appointed to carry to Washington. This plan, in brief, provided for the abolition of the junior class and the grade of acting midshipman, and for the instituting of a "body of lads to be called Cadet Midshipmen," who, after two years, would be eligible for enrollment in the Navy as midshipmen, and who would not be available for sea service before that time. These cadets were to be admitted only once each year, in October, instead of at random, and their pay was to be that of cadets at West Point. Apparently the trip to Washington was blocked by the Superintendent, for, on December 22, 1848, he ordered the board to consider remedies for the present unsatisfactory methods of admission. The board's report to him was in substance as stated above. The Superintendent ordered the board to reconvene to modify its recommendations to agree more fully with his own ideas, if they saw fit to do so. These, and several other changes were recommended to the Secretary during the next two years, but he was making haste slowly. One group of the older officers thought that the midshipmen had to get the sea habit by getting to sea while very young, which of course would not obtain were they to go to school first. Because of these diverse opinions the Secretary chose to delay action to await the crystallization of sentiment one way or the other. If legislation were secured and later proved to be wrong its revocation could be secured only with difficulty.

On page 55 of the Journal is a diagram showing the board's interpretation of the marking scale. From 0 to 2 was "bad," 4 was the upper limit of indifference, 5, 6, and 7 were "good," 8 to 10 were "very good." The subject familiarly and slangily known as "grease" had been known for several years prior to 1921 as "Military Character." In casting around for a term more appropriate, for use in a naval service, the term "aptitude for the service" was hit upon, and adopted. Apparently the wheel is still revolving, for that is identically what it was first called.

In 1849 Secretary Preston felt that it was time to go ahead with the re-organization of the school. Accordingly he appointed a board to consider the plan submitted by the Academic Board, as mentioned above. The regulations which resulted from the report of this special board became effective July 1, 1850. There is a copy at the Naval Academy. At this same time Commander Stribling became Superintendent. The salient points of the new plan were as follows: The name of the school was changed to U. S. Naval Academy; it was placed under the general supervision of the Chief of the Bureau of Ordnance and Hydrography except that for disciplinary matters the Superintendent was to deal directly with the Secretary of the Navy. The Superintendent retained immediate charge. The Executive Officer was henceforth to be known as the Commandant of Midshipmen, and was also to be instructor in naval tactics and practical seamanship. The Superintendent was to be, ex-officio, President of the Academic Board. The duties of the board were delineated. There were to be no more admissions at random. Examinations of candidates were to be held each year, October 1-5 only. Candidates upon admission became acting midshipmen and remained two years at the Academy before going to sea. After three years at sea the midshipmen were to return to the Academy for the two final years of the course. The satisfactory completion of it established eligibility to be examined for a commission. Semi-annual and annual examinations were provided. In October of each year a board of visitors headed by the Chief of the Bureau of Ordnance was to inspect the Academy. Conduct had equal weight with mathematics in the determination of class standing. Many of the restrictions on a midshipman's

life in force today were required by the report of this board in 1850.

It was also in 1850 that Commander T. T. Craven became the first commandant of midshipmen.

On July 1, the Academic Board was convened with a Superintendent sitting as its President for the first time. This is the present practice. Professor Chauvenet, who had served so faithfully, was appointed secretary. The time schedule approved then, is the first providing for four classes. It employs the nomenclature at present used (first class, etc.). A footnote by Professor Chauvenet says that:

> In the above program it was understood that after the June examinations the classes would be embarked on the practice ship until the subsequent first of October and the subjects are accordingly distributed upon the supposition that the Academic courses are comprised between October 1 and June 1.

Thus, the first Academic year and the first Practice Cruise!

As has been said, the Naval Academy is this year again sectioning classes according to relative standing. In the old days the idea seems to have been carried farther, for, on July 20, 1850, the minutes observe that, "it is not expected that every member of the class will study the whole of each treatise, but the more difficult parts of a subject will be given only to the most proficient. The lower sections of a class will not study the calculus at all * * * but all these subjects are embraced in the list submitted in order to be prepared to give each student the most thorough instruction he may be competent to receive." Among other books on this list of Professor Chauvenet's was Bowditch's *Practical Navigator* which has just now been supplanted by *Navigation* and the *Useful Tables*. *Navigation* was prepared at the Academy last year. In this old list are books by Professors Chauvenet and Girault. The practice of using books written by local personnel seems to have plenty of background.

An entry of much interest appears in the minutes of July 20-30, 1850. "The board then took into consideration the scale upon which recitations are hereafter to be marked. It was the unanimous opinion of the board that the scale from ten to zero was too wide. After discussing the merits of the scale from five to zero and of one from four to zero the subject was

postponed for further consideration." And on July 30, "The consideration of the scale of merit was resumed and the following scale was adopted: Very Good 4, Good 3, Indifferent 2, Bad 1, Very Bad 0."

The bilgers appear in the minutes of October 17, 1850, when the department directed the Academic Board to decide the status of two midshipmen who had been dropped and readmitted. The board decided that these midshipmen should be considered as fourth classmen and not third classmen. That remains the present policy.

On December 4, 1850, it again appears that all was not well with the infant institution, for the Superintendent then stated to the assembled board that "the object of this meeting is to take into consideration the present condition of the Naval Academy and the effect upon the system produced by the recent orders of the Secretary of the Navy by which a number of acting midshipmen have been detached before the time prescribed by the regulations, this action in effect being a virtual abrogation of the regulations by the Navy Department * * * ." On motion the Superintendent then appointed a committee "to draw up a suitable report to the Secretary of the Navy setting forth the views of the board."

On December, 18, 1850, we find the board adopting the report of the committee in the form of proposed legislation. The most interesting features of this proposed bill were that:

Naval cadets between fourteen and sixteen years of age were to be appointed by the Secretary for instruction at the Naval Academy and were not to be warranted midshipmen until after being examined at the Academy. (This would prevent students being ordered to sea before the completion of the course.) All appointments as midshipmen were to thereafter be made from the list of graduates of the Academy in the order of merit as determined by the board. The number of cadets was not to exceed twice the number of Congressional districts. The Superintendent was to have the rank and pay of a Post-Captain on sea duty. (This is probably where giving sea pay to a Superintendent started. It has remained in effect until the passage of the present pay bill, which removed this perquisite.) There is

also a provision for a Secretary of the Naval Academy. It recommended that a practice vessel be kept at the Naval Academy. (Operations this year hoped to fit out two armored cruisers especially as practice ships and to be retained for the purpose beginning with 1924, but the cost, presumably, was found prohibitive.)

In forwarding this letter to the Department in December, 1850, the Superintendent said:

By the regulations for the government of the Naval Academy now in force it is made the duty of the Academic Board to report from time to time on the system of studies and instruction, proposing any improvement therein which experience may suggest. In accordance therewith the Board considering it their duty at this juncture respectfully offer their views upon certain points in which the operation of the system requires some modification.

From the foundation of the institution in 1845 the Academic Board has been uniformly of the opinion that the appointment of Midshipmen or Acting Midshipmen as pupils was inconsistent with the maintenance of a uniform system of instruction because of their liability to be drafted for sea service. It was obvious that, if the Midshipmen were to be taught only for short and uncertain periods * * * * no connected course of instruction would be possible * * * *. This result was realized during the last five years and the Board did not fail to represent the evil and to suggest the only remedy which seemed entirely satisfactory; to wit, the creation by law of a corps of naval cadets who should, at least to a certain extent, be educated before being appointed Midshipmen * * * *. Mr. Preston assured the Board that the Academic terms should be punctually observed by the Department and that there should be no difficulty in that respect * * * *. But immediately upon the adoption of the regulations and at several subsequent periods it was found that the condition could not be complied with.

The letter then discusses the undesirability of admitting midshipmen at random and goes on to say:

The obvious remedy for this is to connect the two courses and to complete the theoretical education of the midshipman before sending him to sea * * * *. Regardless of conditions it is very desirable that the Academy should be directly established by Congress and its leading features possess the sanction of law.

A description of the proposed bill is then begun:

The delay in the reception of his warrant will secure to the Midshipman that age and maturity which it is necessary he shall have to command others and at the same time will not carry him beyond that age at which sea influences stamp those peculiar habits which are held essential.

The reason for placing the Academy under a Bureau Chief was,

> to relieve the Secretary from details, the delegation of which to a Bureau would, from the greater permanency of its Chief secure uniformity of action in respect to the Academy.

Referring to the recommendation for a practice ship, the letter reads,

> this refers to a measure which has been recommended by every naval board that has had the subject of naval education under consideration.

Commander Stribling signed the letter.

Another change in the marking system appears on December 30, 1850, when the board resolved that "henceforth the weekly averages be extended to tenths and that no decimals be used in the daily notes."

It is common talk with each generation of officers that the Navy is going to the dogs and that midshipmen do not study "as they used to in the old days." The following table leads one to believe that this point of view shows ultra conservatism so far as any new thought is concerned. The names are omitted from this copy for obvious reasons, but there is sufficient data shown to indicate the board's opinion of the midshipmen deficient at the semi-annual examinations in 1851.

Name	Class	Branch in which Deficient	Habits of Study	Aptitude	General Deportment
	2	Geometry	Not Studious	Fair	Pretty Good
	2	Geometry & French	Not Studious	Little	Good
	4	Arithmetic	Rather Studious	Uncertain	Good
	4	Geography & Grammar	Idle	Fair	Trifling
	4	Arithmetic, Geography & Grammar	Studious	Uncertain	Good
	4	Arithmetic & Grammar	Not Studious	Little	Good
	4	Arithmetic & Geography	Idle	Not Much	Bad
	4	Arithmetic, Geography & Grammar	Very Studious	None	Very Good
	4	Arithmetic, Geography & Grammar	Idle	Little	Bad
	4	Arithmetic, Geography & Grammar	Idle	Moderate	Very Bad

It would be very interesting to know why the only man on the list to be awarded a "very studious" had no aptitude for the service.

There is a policy now in effect not to bring "bilgers" back to the Academy during fourth class summer. There appears to be an analogy in the following entry in the journal, of June 9,

1851, referring to a recommendation that five midshipmen be dismissed. "In this connection the board would observe that the influence of the *Midshipmen* has been very injurious to the *Acting Midshipmen*, and that unless they can be made to feel the importance of diligently applying themselves to their studies, and of a strict observance of the regulations much cannot be expected from those just entering upon their career in the Navy."

In July, 1851, the Superintendent again wrote the Secretary urging the immediate establishment of the four-year course (continuous), and early passage of the bill mentioned above. This seems to have made a favorable impression, for the Secretary referred the changes recommended to the Board of Examiners of that year, together with the proposed regulations as suggested by the Academic Board. The Board of Examiners made minor modifications in the plan, and, as revised, it was then approved by the Secretary, Mr. Graham. These papers are the basis of the Naval Academy as it is today.

One of the modifications inserted then, only later to be revoked, was the one providing that no candidate or midshipman who had failed could have another trial.

The first practice cruise was made in 1851 in the *John Hancock*. Commander Stribling, in writing to the Secretary, refers to the successful nature of the cruise:

> The practicability of giving thorough instruction in seamanship on board the practice ship during the four years in which the students would be in connection with the Academy is now no longer a subject of speculation, but has been fully proved even by the short experimental service on board the *John Hancock*, where, although under conditions somewhat unfavorable it became apparent to everyone that no actual service as a Midshipman on board a man-of-war could possibly be so efficacious in training the young officer.

In the minutes of January 10, 1852, is found the first reference to what is now the most talked-of thing at the Naval Academy—the 2.50. A resolution of that date reads:

> that those Acting Midshipmen of the fourth class whose averages for any week do not exceed 2.5 in both Mathematics and English studies which they are now pursuing shall, during the evening study hours of the week following, prepare their lessons in one of the recitation rooms under the superintendence of an officer detailed by the Superintendent * * * *

In the report of a committee of January 19, 1853 on "relative

weights, or maximum numbers attainable in the several branches taught at the U. S. Naval Academy and in Conduct" it is noted that, whereas the greatest weight assigned to any study was 350 for first class seamanship, first class conduct carried a weight of 500. One who would stand at the top had certainly to behave in those days. The maximum aggregate for first class year was 2,850. On April 23, 1853, the board changed the maximum to 1,000, and scaled down the other weights in proportion. On May 7, the complete table was revised, but the maximum of 1,000 was unchanged. The board reduced the conduct weight to 100, saying, "experience having shown that the weight assigned to conduct it too great, the board has disregarded it . . . ."

On May 17, 1853, the board—the Superintendent having left the chair—took action of a rather unusual nature in a military service, by writing the Secretary of the Navy a letter requesting the retention of the Superintendent, due for detachment. I quote only a part in the interest of brevity.

May 17, 1853.

Sir:

The Academic Board having heard with deep regret that preparatory arrangements have been made for relieving our present respected and efficient Superintendent, before the first of October next, desire very respectfully to ask your attention to some considerations, which, they earnestly hope may induce you to change your intentions on that subject.

The office of Superintendent of this Institution is one of great importance. As the Academy must, in future years determine the character and tone of the whole Naval Service, so the Institution itself receives in no small degree its tone and character from the Superintendent for the time being. It is then, obviously, of the highest importance, that this officer should be selected with great care and with the most scrupulous reference to his peculiar fitness for this very responsible station. No sentiment of personal regard, no solicitations of friends, no consideration of political expediency, ought to have the least weight in determining the choice; still less ought this Academy to be considered as merely one of the Shore Stations, to which, as to a Navy Yard each officer may claim to be ordered, in his turn.

The duties of the Superintendent are delicate, responsible and laborious in a high degree. They are, moreover, so entirely different from every other duty to which a Naval Officer can be liable, that no degree of experience in the ordinary service can avail him greatly in the office of Superintendent.

* * * * *

The Board hope, Sir, that the views they have taken the liberty of presenting, may be patiently considered and, that you may see fit, upon a revision of the matter, to reverse your intention of changing the Superintendent of the Academy.

In the minutes of October 26, 1853, we find Professor Chauvenet taking his seat as Professor of Astronomy and Navigation, while Professor Coffin took his seat as Professor of Pure Mathematics. This founding of the department of Navigation was brought about because there had come to be too many midshipmen at the Naval Academy for one department to teach both pure and applied mathematics.

The board's efforts to retain the Superintendent seem to have been of no avail, for on November 1, 1853, Commander Stribling was relieved by Commander Goldsborough, whom the Department apparently went to much trouble to have sent here. In turning over the command, Commander Stribling made a short address to the officers and midshipmen assembled in the Lyceum. Those parts which are addressed to his relief and to the student body are extremely pertinent and show how little the Academy has changed basically since his time.

Gentlemen, You are assembled today to witness my surrender of the command of the Naval Academy to Commander Goldsborough, who has been appointed to succeed me. Before doing so I desire to make a few remarks. To you, young gentlemen, I desire to make a few observations. Some of you have been students at the Academy for more than two years and in that time witnessed many changes in your classmates. Halt of the class who entered the Academy in 1851 are no longer here. Can there be any doubt as to the cause of this? I suppose not. You will *all* say "the idle and the vicious have been sent off." With such a warning before you, are you *all* doing your best to avoid a like fate? I fear not. Young gentlemen, you occupy a very important position. For the education of the officers who are to hereafter command our navy this institution was established and you are the first who have enjoyed its benefits. How great would be the disgrace if you should leave this institution without having derived all the benefit which was expected from the opportunity for improvement you have enjoyed. Your own honor, that of your families, this institution, all call upon you to apply yourselves diligently to your studies and to conduct yourselves with propriety, that you may leave the Academy with honor, thoroughly furnished for your profession and ready to enter upon its duties with zeal and intelligence. Young Gentlemen! you are now the representatives of your respective states here, and your friends at home are watching your progress with no little anxiety. Hereafter you

will be the representatives of the nation in all parts of the earth. Should not these considerations stimulate you to exert every faculty that the honor of your state and nation may through you be increased and perpetuated? I trust it will be. * * * *.

To you, Sir, who are appointed to succeed me in the government of the Academy, permit me to say that you enter upon your duties here under peculiar circumstances. The Government thought proper to order you here from an important command on foreign service to take command of this institution. No similar case has occurred within my recollection.

Sir; The duties you have to perform are * * * * no less than the preparing and sending out the future commanders of our fleets and ships. The eyes of the Navy and of the Country are upon you and the Academy. I trust that with the able assistance of those around you, these expectations will not be disappointed; and that in future years we may point to the graduates of the Academy as the brightest ornaments of our profession.

Gentlemen, My official connection with the Naval Academy is closed. Not so my solicitude for its prosperity, this can only terminate with my life. Wherever I may be and whatever may be my future employment, I shall ever feel a deep interest in your prosperity and the Institution with which you are connected. I now bid you all an affectionate farewell. May God bless and prosper you all, and through you, this institution.

The minutes of February, 1854, say:

In no case has the board reported a deficiency at this February examination in the fourth class where final action might in their opinion, be judiciously deferred until the June examinations.

This thought has survived the test of time, for only recently someone said that February is a cold month and midshipmen may well be dealt with somewhat leniently at mid-year.

It was also in 1854 that it became necessary to invent a diploma of some sort; for it was then that the first class graduated under the new system. A sample of what the board was pleased to call a Certificate of Graduation is entered on the minutes for March 11.

The entries in this, the first of all the journals, end on June 20, 1854, with a prosaic discussion concerning the selection of a suitable textbook in Natural Philosophy.

This one journal witnessed the founding of the Academy, carried it through the various transitional stages up to the basic plan used today, and bears the merit roll of the first class to graduate from the Academy. The many ideas of its earlier pages, still basically in use, prove that the Navy is, as has been

charged upon occasion, ultra-conservative, or that our predecessors were thoughtful men of vision who builded well. The latter is the more probable, and surely the more pleasant thought. After all, human nature is human nature whenever it may be. The boy of today is the man of tomorrow. Midshipmen come and midshipmen go, but the psychology of human nature is unchanged.

At any rate, the record of the achievements of those early groups of thinking men makes a volume of consuming interest.

THE NAVY AND THE NORTH POLE

By Lieutenant Commander Fitzhugh Green, U. S. N.

PRESIDENT COOLIDGE in his letter to Secretary Denby of November 20, 1923, authorizing a naval expedition to the north polar regions said: *"As it fell to the Navy to achieve the final goal, through the efforts of Admiral Peary, it is eminently fitting that the Navy should continue the work. . ."*

To the casual reader this seems a contradictory statement. The North Pole, "the final goal," has been discovered. What, then, does the President mean? What work is there for the Navy to continue?

Turn to the arctic map. The North Pole marks its center. Close aboard lie Greenland and the contiguous archipelago on one side; Siberia and its outlying islands on the other. Just as close above lie Franz Joseph Land and Spitzbergen. The fourth sector is blank.

This blank is something over 1,000,000 square miles in area. It is the greatest cartographic vacuum in the world. It is the last large geographical mystery on the surface of the globe.

To fill this blank, to relieve this vacuum, to clear up this mystery, is what the President chiefly meant when he said *"the Navy should continue the work."*

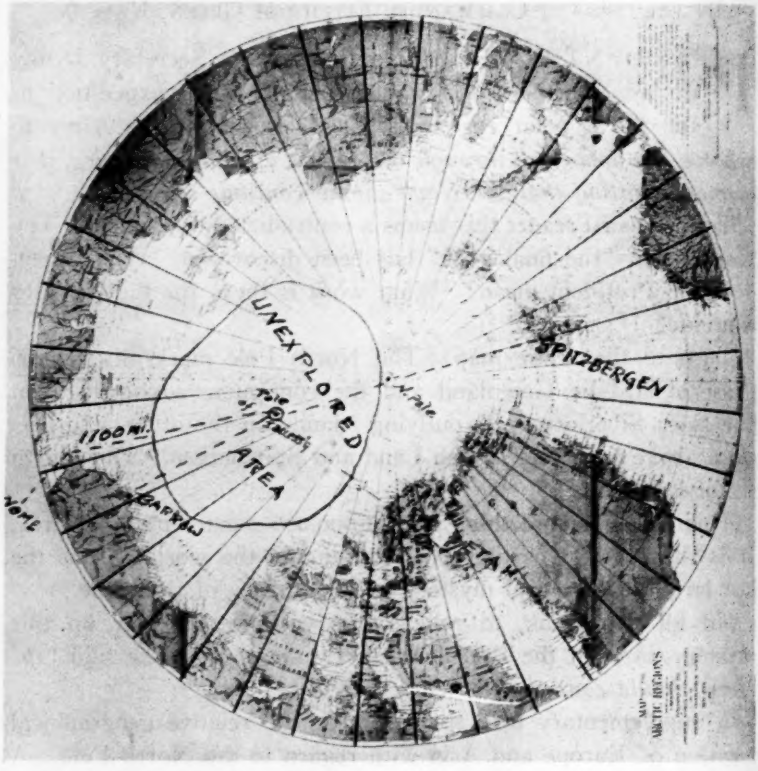
A supplementary task springs from the relative geographical location of Europe and Asia with regard to the North Pole. A library globe will show that it is about twice as far from London to Tokyo by the regular trade route as it is across the Pole: 11,000 to 5,500 miles in approximate figures. Whence trans-polar traffic of the future.

So we may express the two-fold mission of an air expedition to the polar regions as:

First, explore the vast unknown area north of Alaska.

Second, establish the practicability and the aerology of a trans-polar air route.

The focus of our exploration will be what has been called "the Pole of Inaccessibility." This point is the center of the unexplored area, roughly 82°N. and 165°W. Spitzbergen, Etah, (Greenland) and Point Barrow are all within flying distance of it.



MAP SHOWING UNEXPLORED AREA, AND "POLE OF INACCESSIBILITY"

Spitzbergen lies nearest the North Pole. A plane could fly from a base there to the Pole and back without great difficulty. But nothing in particular would be gained by such a flight. Peary's work is indisputable. We know that land does not lie at the Pole. Hence a flight from Spitzbergen, such as Amundsen and his planes will make, must be a one-way venture to cover any of the vast space above Alaska. And since this dis-

tance is about 1,700 miles, which must be made in a single hop, the project boils down to a conspicuously daring feat, quite distinct from the work the President had in mind.

Etah is the second possibility. It is 700 miles from the North Pole and about 900 miles from the Pole of Inaccessibility. But Etah is not available as a base until about August 1. Its name means "the Blow-hole of the World," and is derived from the incessant winds that roll down upon it from the ice-cap looming 5,000 feet into the sky just east. Its habitations consist of three stone huts which may or may not be occupied by natives.

BUILDING IGLOO ON POLAR SEA: SMOOTH SURFACES WHEN SNOW-COVERED ARE VERY DECEIVING

It has no flat plains for landing fields. Ice and game conditions are not dependable. Etah as an air-base would be a frost figuratively as well as literally.

Point Barrow is about 700 miles from the Pole of Inaccessibility; closer than either of the others. It is on the threshold of the unknown. It has just the terrain for aviation work. It has available both food and native labor. It is on American soil. It is an ideal base except for two things: On account of ice Barrow cannot be reached until August; and the open season lasts but a few weeks.

Assume for the sake of keeping concrete images in mind, that

in order to explore the unknown region north of Alaska and to establish the practicability of a trans-polar flight we send a 10,000-ton station ship to an Alaskan port, say Nome, some time in June. That is the earliest month in which the harbors near Bering Strait break out. Attached to this ship are a group of planes equipped for landing on ice and on water. She also carries material for a mooring mast in case a dirigible is to be used.

This particular assumption is made because Spitzbergen is too far on the other side of the Pole of Inaccessibility to permit satisfactory exploration and Etah has wind and ice conditions too uncertain to risk our aircraft in. Barrow with its late ice and early closing is out of the question, unless we establish a base there the first year with the idea of using it the next.

It should be recalled that some heavier-than-air flying has already been done in high latitudes. So far as cold is concerned no especial trouble may be anticipated. During summer months the average temperature over the polar basin remains within five degrees of the freezing point. There is open water in the "leads" or tide-opened cracks and in pools that form on the ice. There is level landing space on the floe surfaces. With specially constructed pontoons for either ice or water, any plane could fly any place over the Polar Sea between May 1 and September 1.

So far as meteorological conditions go, the same applies to use of a dirigible in polar regions. She might have to ride out an occasional summer gale or a sixty-mile southwest wind. Strong northerly breezes might buffet her along the upper side of the Barrens. But actual flying would ordinarily be done under better conditions than during the same months in lower latitudes.

Lest there may be doubters of the last statement, attention is invited to the three essential features of easy lighter-than-air work: steady wind, equable temperature, and daylight. North of the arctic circle there are no circular storms, hence naught but steady winds. Diurnal variation of temperature is miraculously minute. And daylight persists twenty-four hours out of twenty-four.

Speaking broadly, then, the arctic is not only perfectly accessible to any form of airship, but is in many respects better suited to flying than any other part of the earth's surface.

Now what could we do from our 10,000-ton ship and the shore base she would establish?

A table of distances is most illuminating:

Nome to North Pole	1,560 miles
Nome to Pt. Barrow	526 miles
Pt. Barrow to North Pole	1,117 miles
Nome to Pole of Inaccessibility	1,100 miles

Not only are these distances great (they must all be doubled for a flight there and back); but they are over the wildest and most lifeless portion of the earth's surface.

A simple flight from the northern base to the far edge of the unexplored region and back is over 3,000 miles. But a cruising radius is figured for still air. So a head wind of twenty miles an hour on the northward lap would at once increase the relative distance to over 4,000 miles.

Hence, thoroughly to explore our objective we must make at least ten or twelve flights from the base and back, each covering a definite sector of the blank portion of the map.

If land be sighted we should probably find it safer to return to the base and fit out a special flight for taking possession of the new territory. This flight must have arrangements for relief included because of the danger involved in coming down on the ice or on a snow-obscured terrain.

Some idea of the problem of using heavier-than-air machines over the Polar Sea can be gathered from the radio report we had from Amundsen's ship, the *Maud,* (drifting in the pack) last fall. It said in part: "Besides there is hardly a single natural landing place in the district. . . . Seen from the air it is level enough, but in fact there is hardly one flat surface of 300 feet in length. Therefore forced landings are dangerous."

Which brings us again to the handicap of distance. Our northern base is 1,500 miles from Seattle, the nearest source of equipment. We must, therefore, be self-supporting. The season is too short to admit sending home for spare parts. The plane that is smashed on the ice is out of the race for the year.

Looking at such an accident from the aviator's viewpoint, suppose that while flying over the Polar Sea he be blown off his course. It is conceivable that search for him may have to be

made within a circle of 500-mile radius. That is twice the limiting dimension used for the lost Army fliers in Arizona last year. And Arizona was full of landmarks. In contrast the Polar Sea from the air is a pimpled desert of blue-white ice.

Or taking the question of fuel: While gales are a rarity in summer north of the arctic circle, they do occur. And when they come they last. Circular storms as we know them do not reach high latitudes. Areas of low pressure are elliptical. "Troughs" they are termed. An air vessel caught in such a blow lasting a week or ten days will not suffer from wind so much as she will running short of fuel. If she be a dirigible she will become a balloon. If a plane she will land and likely become a pile of kindling.

Of course this is the black side of the game. But it was failure to see clearly the black side that made of the Greely and De Long expeditions such debacles. To find and rescue a summer flying party marooned somewhere on the ice-pack 500 miles from the nearest land would tax our ingenuity to the limit.

We could send planes out to search. We might find the lost men quickly thus. But we might also by arduous flying cover a great area and still fail. Moreover, some of the searchers might get lost in the polar haystack and be no better off than their brothers.

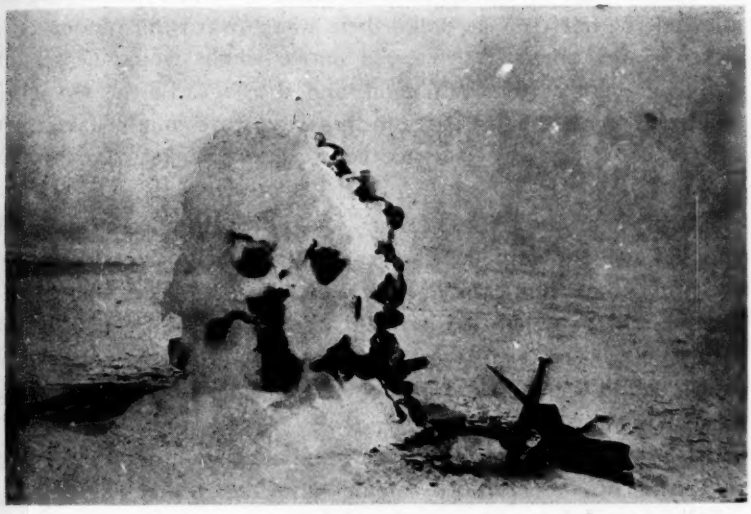
If we sent out a dirigible we should succeed less quickly than with a plane. We should risk more in property and lives. Having but one, we should have to cover not less than 3,000 to 10,000 miles in our search. And we should have to take considerable chances on the weather.

We could let the men save themselves. That is to say, we could train the personnel of our exploring units to shift for themselves on the polar pack, as others have done, and make the best of their way back to land. Stefansson proved the feasibility of such a course; provided, to be sure, that a man knows the game and is skillful in its execution. By "game" we mean seals and caribou as well as the delightful (sometimes) pastime of living off the country.

None of these plans is likely to arouse any great enthusiasm. None has the definite tangibility of a life-preserver, which, when

the swimmer is sinking, can be thrown to his aid with assurance that it will keep him afloat until better help comes.

Those who know the arctic will agree that this rescue business is the hardest part of all northern work. When weather is clear and crisp and the ice is right and the sun swings unsetting there is no place in the world where man may travel so merrily. But when parties get separated from one another and summer drift hides the sun there is likewise no place in the world where well-laid plans go more easily awry.



PEARY'S CAIRN AT CAPE THOMAS HUBBARD FROM WHICH PEARY SAW NEW LAND IN THE UNEXPLORED AREA OF THE POLAR SEA

The natural temptation is to slur over this side of preparation. But what a stew the country was in when Greely's little party were lost and starving! Congress (cursing) appropriated practically unlimited funds to save them. And when the story of the tragedy became known anathema was heaped unstinted on the heads of those who had made such horrors possible.

There is no sense in rattling the bones of the dead. But while the writer was in North Greenland, four Eskimos and himself cached over 4,000 pounds of walrus meat within forty-eight hours on the very spot, and almost on the very date, where

Greely's men lay starving. Indelibly was impressed upon his mind how fatal a slight omission can be in arctic work.

It is neither safe nor appropriate here to venture a scheme for succoring members of an arctic air expedition that may get themselves into difficulties. But it may interest the reader to gain some idea of what such a scheme would be like.

Each plane or dirigible could be supplied with special bombs. The sector or zone in which the enforced landing might occur would determine which of three points, say, would be selected for rendezvous. When an aircraft failed to return time would be allowed for her crew to make their way toward the rendezvous. After a prearranged interval the smoke bombs would be set off daily by them at 6 A. M., noon, and 6 P. M. In the event of failure to locate the lost party in this way, stores might have been cached at Wrangell Island to the west, or Banks Land to the east.

Some such scheme would have to be devised. But without proper sledging equipment and with the vast spaces involved the problem certainly would be a knotty one.

It should be noted in passing that even were our naval expedition delayed this question of rescue may become a timely theme when Amundsen makes his flight from Spitzbergen to Barrow next summer.

Also to dispel the popular idea of fearful conditions to be met in the north some mention should be made of the truth. It is wholly fanciful to suppose that inhuman temperatures are encountered north of the arctic circle; or that darkness of the polar night puts an end to all work; or that scurvy is an unavoidable corollary of protracted northern exploration.

Cold is just as severe in Michigan or Winnipeg as it is at the Pole, though less persistent. Scurvy is just as prevalent in New York or Chicago as north of the arctic circle, though not so well advertised. Both evils can be anticipated and guarded against by proper clothing and diet.

To avoid these hazards by swift achievement and return, to defeat them if forced by accident to accept them, comprises the chief task of preparation for an arctic expedition.

The question naturally arises when one views with misgivings

the "perils of a polar flight," as the press euphoniously prints it, what is the sense of it all? Why is the game worth the candle?

There are several fitting replies, all in the affirmative. For instance, establishment of the feasibility of trans-polar flying might give our commercial aviation just the boost it needs. Scientific results, not only along aerological lines but in many other branches, would no doubt repay us fully for the effort and expense. Alaska might profit indirectly from the advertising she would get. And there is always the alluring object of filling in

POLAR SEA NORTHWEST OF GREENLAND: THERE ARE BROAD SPACES OF LEVEL GOING BETWEEN PRESSURE RIDGES

a blank space on the map. But the real urge that warrants another expedition northwards is the possibility of finding land.

The reader will promptly envisage a rocky nubble surrounded by ice. He may be right. But consider the possibilities. The state of New York has an area of 47,000 square miles. Its population is over 10,000,000 people. It is a considerably large tract of land with a goodly number of people on board. Yet the state of New York would appear as but a tiny island in the vast unexplored region of the Polar Sea!

The chance that land will be discovered is good, good enough,

in fact, to warrant even under the circumstances a determined effort to find and claim it.

Whalers have reported that they have actually seen land during open seasons when blown north by protracted southerly gales which occasionally occur in the vicinity of Point Barrow. Peary, further east, reported that he saw land from the summit of Cape Thomas Hubbard. On his last two trips out over the polar pack he encountered what he called the "big lead," an extensive rupture of the heavy floes running generally east-west. This lead may have been the wake, so to speak, of a body of land to the west past which the pack-ice drives.

Additional evidence lies in the study that has been made by members of the U. S. Coast and Geodetic Survey of tidal and ocean current data brought back by various expeditions. The principle is simply that the presence of a land mass always deflects water-flow in its vicinity. Erratic drifts of the *Fram* and of the *Jeanette* add contributory data to solution of the riddle.

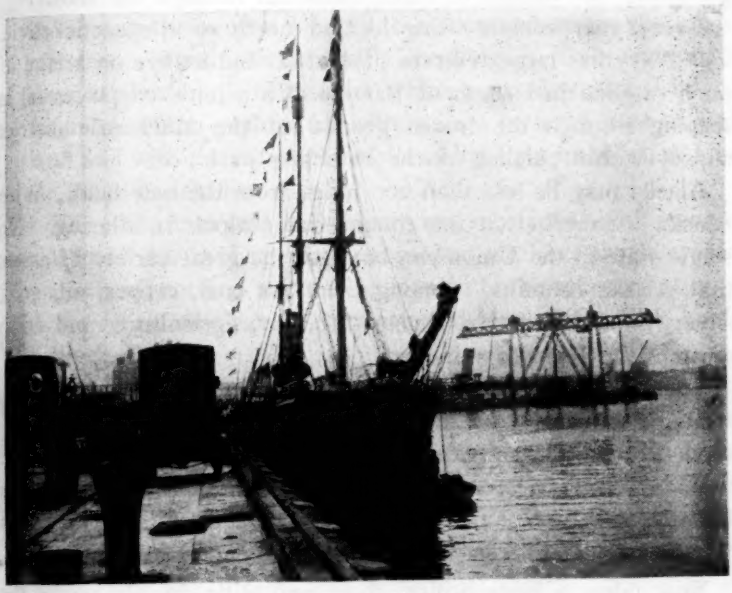
It is possible further to picture the Philippine-Japanese-Aleutian line of volcanic activity carried on across the top of the globe. At its further end we find Iceland with a tragic history of lava flows and earthquakes. Its surface is mottled with springs of boiling mud and geysers. Over 100 major volcanoes pierce the heavy fog that blankets it. Whence we may argue that in the 1,000 miles of mystery above the Aleutians another fire-built land-mass may exist.

The only substantial argument against the possibility that land may be found is what is known as the "tetrahedral hypothesis." Laboratory experiments have demonstrated the fact that a sphere of viscuous matter, such as putty, when rotated at high speed not only becomes oblate in form, but tends to assume the figure of a tetrahedron with an apex at one axis of rotation and a base at the other.

Scott and Amundsen found the South Pole located at the summit of a plateau 10,000 feet above sea level. Peary took a sounding at the North Pole and got 1,500 fathoms. Other soundings on his line of march, as well as those of the *Fram* to the westward, all indicate that the bottom of the Polar Sea is a sub-

merged plain corresponding roughly to the elevated antarctic plateau opposite. Thus we have an apex and a base for our terrestrial tetrahedron. Dihedral angles may be traced along north-south ranges of the continents and along east-west chains that skirt the northern lands.

But this proves nothing more than the unlikelihood that any large continent will be found. An island or group of islands, volcanic in origin, is both possible and probable.



STEAM SEALER "DIANA," AT NEW YORK NAVY YARD: THIS TYPE OF VESSEL BEST FITTED FOR ICE NAVIGATION

The value of such land is not as problematical as may appear. It will probably be ice-girt, rocky, mountainous, devoid of vegetation, and innocent of all animal life. Yet it may be immensely valuable.

A hundred million years or so ago when the earth was in its infancy its speed of rotation was much higher than today. A warm and humid climate prevailed over the major portions of its surface. There was no icy arctic region. Fish in countless millions infested a tepid Polar Ocean. Vegetation was dank where now huge glaciers lie.

Incalculable time passed. Profound changes in the earth's crust and climate came about. The fish died. Vegetation vanished, was buried, then subjected to immeasurable pressure. The fish were metamorphosed to oils; trees and giant grasses to coal.

This amazing tale is no figment of the imagination. MacMillan and the writer sledging up through Ellsemere Land to the Polar Sea, surrounded by glacial ice, buffeted by blizzards that scarcely ceased in summer, found time and again clean seams of coal glistening like masses of black diamonds through the snow.

Every year coal is being located north of the arctic circle. The Navy has large reserves in Alaska, and its eye on a lake of pure vaseline just south of Barrow. In a hundred places oil is seeping through the frozen ground of the Mackenzie district almost within earshot of the rumbling pack ice.

Alaska may lie less than 200 miles from the new land. With Alaska as a criterion the commercial outlook is alluring. No single state in the Union can boast of the great variety of assets that Alaska contains. Among them are coal, copper, oil, gold, silver, tin, lead, marble, timber, fish, fur, agriculture, and fresh meat in the form of reindeer.

Then there is the more abstract, but none the less important, strategic value of such a land.

Picture Europe and Asia as the two great reservoirs of trade. Today they are connected by long thin pipes of traffic via Panama and Suez. It is not a gross exaggeration to say that commerce only trickles through these pipes.

Now fancy a huge orifice, short and wide, by air across the Pole. The thought is not far-fetched. It taxes the imagination no more than did the dreams of early friends of steam-cars when they visioned our continent girt with railway lines.

Trans-polar traffic when it comes will come with a rush. Remember the Panama Canal which was looked upon as a fool idea by many intelligent Americans. And already—last summer to be exact—plans have been worked out for a new canal because the present one isn't big enough to stand the flood of traffic its short-circuiting of trade invites!

An oasis in the Polar Sea will strategically control such traffic. We may picture it as a half-way stopping place, a service station

for supplies of fuel and for repairs. We may by slight effort of the imagination envision all sorts of miraculous things such a land might stand for.

On the other hand it savors of maritime frailty to invoke a pot of gold at the Rainbow's end in order to hearten us for the search. Since the beginning it has been one of the traditional duties of our Navy to open and guard the seas that border American territory. The new task beyond Alaska is specifically that.

Viewing the project broadly, the proposed arctic venture is in no sense a stunt. Nor, broadly speaking, is it a variation from the established type of task for which a naval service is intended. Its mission is to explore an unknown sea with the hope of finding land and with the assurance of throwing light on whether a polar air route is feasible.

The difficulties and the dangers are substantial both in number and in kind. In discussing the project we have dwelt especially upon them, not in a spirit of opposition to the scheme but because in no other way can the gravity and size of the task be fully delineated.

The chances of profit are great. They may be painted in far more vivid colors than is appropriate for a serious discussion of the subject. Yet to treat only of the broad scientific research that can be carried out on such an expedition easily establishes the justification for it.

Naval precedent for such an enterprise has been set by Wilkes, Kane, De Long, Peary, and a score of others. National profit of northern land has been exemplified by Alaska. The idea has been fostered by the President of the United States. From which we conclude that execution of the task is but a matter of time—and money.

THE NAVY AND MARINE MEMORIAL

By Rear Admiral Bradley A. Fiske, U. S. N. (Retired)

A MOVEMENT is under way to erect in Washington a beautiful and stately monument of sea-green bronze, as a memorial to the men of the sea, and dedicated to those who have been lost.

There is no such monument anywhere in the world. There is no monument that attests any appreciation by men and women of the dangers which the men of the sea have braved, or the conquest of those dangers which they have achieved. There is no visible reminder of our debt to the men of the sea, for securing that safe passage of the sea which has welded widely separated countries into a coherent world.

Though monuments to military commanders adorn selected spots in all the civilized countries of the earth, only a few monuments to naval men exist; and virtually all of these commemorate war achievements only. The long and hazardous voyages of the naval and merchant seamen who made the ocean safe for commerce and spread civilization over the earth, though told in song and story, have never received the recognition which all men know to be the highest; that of an enduring monument, erected on some exalted spot, where it can be seen of men.

Such a monument appeals to the mind in a way in which no other thing appeals. It stirs the imagination, it gratifies the sense of beauty, and it stamps the thing memorialized as a thing which men have pondered in their minds, and declared supremely good. It lifts the thing memorialized to a plane as high as the mind and will of man can lift it. It is the most perfect tribute that it can enter into the heart of man to render.

Such a tribute it is the intent of the Navy and Marine Memorial Association to render to the men of the sea; to the men of the sea of all nations and all times, but especially those of our own nation and our own time. It is to be dedicated to those who have

THE NAVY AND MARINE MEMORIAL

lost their lives in service on the sea; but it will memorialize, as well, those from whom the supreme sacrifice was not required, but who braved the same dangers as those from whom it was required, and stood equally ready to make it. It says to the countless millions who have profited by their work, that they must not forget that work, or neglect the men who did it.

And it symbolizes the grandeur of the sea. It suggests to those who move "along the cool, sequester'd vale of life," and dwell in the safety and tranquility of the commonplace, that there is another life, a life beautiful and wonderful and inspiring and inspiriting and dangerous. It calls to them to study that life, to read and ponder the voyages and discoveries, not only of Columbus and Magellan, but of the countless other seamen and discoverers, "whose deeds, though manifold, no Skald in song has told, no Saga taught thee"; yet who, against the resistance of storm and privation and tropic heat and arctic cold, insistently carried the flag of civilization to lands uncilivized and unknown.

It has been said that the British Empire is great because so many Englishmen lie at the bottom of the sea; so also may we say that we are great and powerful and prosperous, because under the waters that wash our rugged coasts, lie thousands of our own blood who died to bring these things to pass.

So, while this monument symbolizes the grandeur of the sea, it powerfully suggests the grandeur of the seaman's art, which has made a conquest of the sea and marked a myriad of paths across its forbidding waters. And it calls on every one to visualize what seamen have done for him, and to pay a rightful tribute to those who, through all the dim centuries of the distant past and the brilliant years of the recent past, have "gone down to the sea in ships, and have done their business in great waters."

TACTICAL RAMBLINGS

By Lieutenant Commander E. G. Allen, U. S. Navy

IN ATTEMPTING to get one's feet on solid ground in studying naval tactics, a student, after covering all of the authoritative literature on the subject, is bound to be struck by the meager amount of real material at his disposal; by how little of it he can take to himself practically to give him the feeling that "Now I know about Naval Tactics, what it is all about, and how they do it." If he compares the naval literature with that by military writers on land warfare he will find a much greater volume of comprehensive work, and a better grasp and appreciation of the subject held by these men as compared to the naval writers. Oddly enough, a great deal of the best literature on naval warfare has been and is being written by civilians.

While there are many good reasons for this condition; as great naval battles are few and far between, and the naval profession has produced few men of outstanding ability as writers and interpreters of naval warfare, still the condition exists, and the student is likely to halt his study with a comprehension of a few of the familiar tactical bromides, such as "superior force at one point," "artificial and natural concentrations," "the bearing of the battle line at right angles to the bearing of the enemy," "the initiative of the subordinate," along with the prevailing ideas of the use of types of weapons, and call it a day so far as the subject is concerned,—although perhaps with a sense of misgiving that all is not well, that he may have missed the key to the problem somewhere along the line. While this article is not going to furnish the key to the naval tactical heaven it is an attempt to clear up some of the fog that obscures the subject, and deal with practical tactics, or better, with warfare in its unity.

In general it seems to the writer that the following points are essential for the student to get oriented properly in his study and work:

1. There is in existence no convincing treatise on the art of naval warfare. There are, however, some good records and annals of naval warfare and of battles, and some books and pamphlets covering the mechanical application of formulae and rules for handling tactical weapons.

2. That since military writers on land warfare have produced the best literature on warfare the historical background can be acquired and adaption of the material to sea warfare made, and this procedure offers a wide field for observation, study and application that must be largely utilized. In the opinion of the writer the best short treatise of this character is Foch's "Principles of War."

3. No attempt should be made to make a theoretical distinction in the mind between strategy and tactics and carry it to cases. The two go together comprising warfare, since all effort in the combatant forces leads to the tactical fact battle. If you do not study, visualize, and think of the subject as a whole, and apply it as a whole you are befogging both the issue and your own mind. Preparation and execution must be considered jointly for proper results.

4. Tactical systems are conventional procedures devised to co-ordinate and apply force to get a result, and are not a result in themselves, nor an algebraic formula which gives the answer no matter what the case.

5. Tactical systems are necessary. Phrases such as "The initiative of the subordinate in battle," do not preclude a system. Wholesale initiative without system means confusion or worse. Three or four hundred ships cannot be co-ordinated without a system, whether it be written, or engraved on the mind by what is called indoctrination.

6. Tactical systems used as effects in themselves without relation to cases, and not as flexible means to apply the existing tools to any particular case bring about most naval defeats because:

(a) They may be too rigid in detail to fit the case which occurs.

(b) They may be antiquated and not adapted to fit changes in types, weapons, and material.

(c) They may be basically unsound, not in accord with the principles of warfare and the dictates of common sense.
(d) They may not be adapted to the tools you are using.
(e) They may not provide sufficiently for delegation of authority and responsibility to proper subordinates.

7. Battles, however, are won by one system beating another and as evidenced by the quality of leadership in the case. The success may be due to an unusual, ingenious or unexpected system, a sound system, or one supported by pure chance or an overwhelming force. Whatever the case, the leaders used some method or system, so that in the study of tactics do not throw overboard the word "system" for a dogma such as "initiative of the subordinate," if that means no direction or order to battle.

8. The great leaders considered that to the field one should take only:

(a) A mind stored with historical study of warfare and facility in practical application of principles to cases;
(b) No preconceived ideas of what is going to happen in detail except plans of general employment and even those subject to change;
(c) Common sense;
(d) Will power;
(e) Imagination or vision;
(f) An organization well trained in a flexible, appropriate system adapted to your tools and to the enemy's, and such that you can co-ordinate, utilize and keep control of your force in any direction and in any contingency;
(g) All available information.

If the student will consider the items listed under (8) as being what he is approaching the subject of naval warfare to study and acquire he will find, presupposing he has a military education, that he can reduce much of it to a course in self-culture, and there will be little left over which is going to be the tactical trick, or bag of tricks or the assimilation of a number of mechanical rules about types and weapons, which he has been looking for. Briefly, he has been thrown back on facility in applying a few general principles correctly in particular cases, imagination bal-

anced by common sense, organization, system and teamwork, will power, acquirement and utilization of information.

Personally, I have spent a lot of time looking for those much talked about and never listed out principles of war or tactics, with illustrations of how to apply them, and the best exposition of the subject in a big way to my mind is in the volume already mentioned, the *Principles of War,* although certain type problems appear in manuals on land warfare, some by officers of our own army.

The naval field is untouched so far as I know for similar works, and this paucity of material is indicative of what little is known about naval warfare here and abroad. Pye's publication marks the only milestone laid by members of our profession in recent years, dealing with cases and solutions in a practical way. Between scouting and screening and a knowledge of how to conduct naval war looms a wide gap to be bridged by some naval writer or tactician of the future.

As a matter of fact, a study of scouting and screening by itself without relation to the fighting which inevitably results from such operations carries a danger and a very serious menace to the student. It seems to me there has been a tendency in our Navy to assume that a line of ships, perhaps defective in speed and armament, can be strewn out to engage in scouting in an enemy area, removed from support, and can carry out the operation as readily as if it were a problem in mathematics. In practice such operations normally would result in catastrophies unless carefully supported. If you wish to scout in an enemy area you must be prepared to fight everything in it, and this fight is as inevitable as night after day. As touched on before, do not get strategy and tactics separated in the mind as though they were not related, and do not get a mental affliction which can consider scouting without relation to fighting, sinking ships and killing men,—as though it were some kind of an exercise in working out a formula. The end of scouting is a blow or a series of blows of some kind delivered by you or on you. This digression is merely a plea to keep in mind and consider naval warfare in study always in its unity, and when dealing in cases to believe nothing and take nothing for fact unless you your-

self can reconcile it to the principles of warfare which are principles of common sense.

The *Principles of War* lists some general principles as follows:

Economy of Forces
Freedom of Action or Security

and follows them by "etc." The tactical principle of "superior power at some point" probably may be substituted for "etc." and these principles together with a knowledge of the use of stick, offense, and surrpise, delegation of authority with responsibility, psychology or morale, are sufficient tools for the kit of any student in order to start learning his trade, or to work at it. This does not imply that he has an easy or short job on his hands, for self-culture is limited only by the application of the student and the span of years allotted him; but these are the tools to work with. For further illustration of what these principles mean, the student is referred to the book already mentioned, which he should read and so find out what the most successful wager of war of our era thinks about it.

Principles, not tricks and methods, are what you need to measure up each case or problem that presents itself. The tricks or methods are what you devise to apply the principles. When some one tells you that a principle of naval warfare is to keep the bearing of the battle line at right angles to the bearings of the nearest point of the enemy, do not swallow the bait, line, hook, and sinker; for here again the method of applying a principle, a formula that fits some cases, has been repeated until a rule is fixed resulting in a dogmatism, a mental rigidity which will be reflected in the physical rigidity of the organization or battle system, and may cause another defeat at sea.

Our old friend the rigid battle line, has brought many a good man down, and I cannot recall an instance of a great naval battle decisively won by its use, not because there is anything inherently wrong with it, but because the system itself was imagined to be a result, principles and facts have given place to rules, common sense to dogmatism and flexibility to rigidity. Paralysis of the brain cells can result from the reiteration of a platitude.

How much our old friend played in the lack of decisive victory at Jutland we can hardly say, but it is likely that he, along with some other rules, comprised a system that did not meet the particular case, which, in this instance, was a maneuvering enemy who violated most of the conventional rules of the contemporary mathematical school of tacticians. Since opponents to our amazement and discomfiture are not bound down to these rules it is evident that we must stick to principles and, even in the case of principles, have such facility that we apply them only when they do apply.

In his *Principles of War,* Foch has outlined the mental processes to be gone through in conducting war based upon unity and maneuver. Curiously enough, the trench warfare of the latest conflict largely restricted his opportunity to carry it to a conclusion. At sea, however, we can visualize no such restriction, as one cannot imagine two fleets engaging fixed in a spot; so war at sea hinges on maneuver and on movements rapidly carried out. Mobility then is our invariable rule, and naval war is a kind of mechanics dealing in movements and space, bodies, velocities, time, and impacts.

At sea, time is a much more important factor than in land warfare. It is essential, therefore, in all naval tactical systems, that every detail be built up with attention to the time factor. In making the necessary dispositions or dispersions of force to carry out the principles of "security" and "initiative," with due regard to "economy of force," (in order that we may guard against strategical or tactical surprise) these details must be based on weights and times,—time to concentrate, time to avoid, time to maneuver, or whatever the case, whether a screen, a scouting line, an advance or scouting force, we must always deal with time; time built around a basic idea of unity of a whole force with just sufficient dispersion to retain security and initiative.

It seems to me that up to the new re-organization of the fleet our naval thought had never progressed beyond the idea of preventing a tactical surprise upon the battle ships, and this became fixed into a system of putting the main strength in the center, surrounding it by outlying screens of ships, the types of which

decreased in strength the further out you proceeded from the center. The service of information was organized or thought of as some kind of a separate thing to be conducted on the side, necessary but not connected up with the main body and likely not in tactical touch. It is obvious that this idea of obtaining information violates the cardinal principles of unity of effort and unity of force, and also that the system of employing your force only to guard against tactical surprise was the first effort of amateurs struggling to work out a method of waging naval war. Obviously such dispositions against an enemy using a proper advance force, in the case of a detached information force, could cause its loss, and in the case of the main body described above, take away all ability to choose the time and method of fighting, or the ability to engage or avoid action as desired.

When we think of the types we have had to put in this service of information or advance force, the more unsound the idea is seen to be, as necessarily the whole fleet is required as a support if the scouting or information service has not the types, in speed and armament, to compare with similar ships of the enemy.

Fortunately, the re-organization of the fleet contemplates a task organization that can operate to give the naval commander some initiative and secure him against strategical surprise. That we have not just the types to put into it, we can lay to our own deficiencies in not knowing what we needed to get a balanced fleet, and to the poor trading at the disarmament conference.

The only danger in the new organization is not in the organization itself, but in the tactical conceptions that get fixed in a profession that has no common school or conception of naval warfare. We hear many complaints about the physical separation of the fleets, as if that possessed any importance so long as there was no idea of separation in the minds of our naval commanders, or of the way to employ these task organizations in their unity. I believe the physical organization in task groups is the greatest step we have ever taken in the direction of major tactics. We must guard against the danger that, because we do not know how to employ them, we may fall back on such con-

ceptions of naval war as would put all the battle ships in a lump and grade out cruisers, destroyers, etc., in a series of circles; and then on the side, organize a scouting force of a lot of trash, propose to send the latter off on a detached job, and expect, on the strength of information that is to be secured by the lambs that have been sent to the slaughter, to move the main body several days behind it in an organization designed merely to prevent tactical surprise.

While I may be painting the picture blacker than it is, it represents the school of thought I was brought up in, and is along the lines on which my impressions were formed when first in training in the fleet.

It seems to me we have never thought sufficiently about strategical dispositions, and the relations of time and weights to them. A scouting line of junk, in an enemy area, could not be removed more than one-half hour from support; if it had a speed margin over enemy types, it might be many, many days away, but would get no information unless it had the weight behind it to drive in and take it. Information is not printed on a card, like a menu, and given you because you reach a certain position, except possibly by aircraft; but is obtained by forcing it, driving in, fighting, taking it in the face of opposition. Even in this case it is of no value unless you are in a position to take advantage of it. The operations of the scouting fleet or advance force are of little value unless they have punch, their own support, to insure information, and are conducted in unity with striking forces or a main body which is in position to capitalize the information. The gaining of information means losses, losses excusable only if the result attained warrants the expenditures. Types in war cannot be dribbled away without getting results.

The battle of Jutland illustrated the work of advance or scouting fleets, and their relation to the main bodies. In the case of the British, the information was largely wasted by navigation positions not hooked up, and the inability of the chief to act on it, through his leadership and tactical system, but so far as illustrating the employment of an advance force and what to put in it, and how it should operate in conjunction with the main body, it offers an illustration for our purposes.

It is obvious that any commander with a force at sea must dispose it in a unity, not based on types of ships, but by tasks and task groups, to achieve a purpose against the enemy force in the area. He must guard himself against strategical as well as tactical surprise, by carrying out the principle of security with due economy of forces, thus keeping the initiative of action in his hands to co-ordinate his force where and when he wishes. He must maneuver behind weight, and so the advance force must have sufficient weight, speed, and armament to carry on a fight, so as to enable him, behind it, to have time to make and carry out decisions. This distance from the advance force depends upon the dictates of common sense, in relation to what he has placed in it and what the enemy has in the area. The less strength a commander has in the advance force, the closer he must be to it, the less time he has, and the less he will know. Never, in any event, must he leave a weak force hanging on the limb, unsupported; defeat in detail must be avoided by proper use of security in dispositions, and by unity, based on weights and time. We are entering a naval era where systems and types have to be modified to follow the progress in the development of aircraft and submarines. From what I have heard, the War College has not only anticipated the use of these new weapons at sea, but, in effect, is utilizing them beyond the practical limitations existing at present.

The successful employment of aircraft at sea is a difficult proposition and actual progress is behind popular and naval opinion. Even the exact utility of the carrier is not determined; here and abroad much smoke is blown, which hides the actual progress. There can be no doubt that the air scout, the fighter, and the spotter can be gotten up from surface ships—but should a restricted carrier tonnage be devoted to the protective and accessory services when blows on the enemy, offense, is the object of weapons and warfare? Even a phrase like "control of the air" must be analyzed into facts which conform to naval tactical requirements. An action may last from two to four hours, and control of the air, if not followed by a proper series of blows from bombers and torpedo planes in time to affect the action, conveys nothing to my mind except phrase turning or a hysteria derived from the romanticism that associates it-

self with the subject of aircraft. Control of the air is of little use on the tactical field to either side if there is no shock to be delivered from the air.

In any event, only the part of the profession that lives in the past and will not face the future, refuses to concede the presence of a new naval weapon more destructive in unit effect than anything except the mine, one that has possibilities of modifying naval warfare to a greater extent than anything that has ever appeared at sea, and one that may almost preclude naval operations off an enemy coast except with an air superiority,—an almost impossible accomplishment against the shore resources of a nation.

If we analyzed what practical problems of primary importance face the administration of our Navy today, we would determine them to be: (1) methods of increasing air power at sea beyond the restrictions set by the disarmament conference for carrier tonnage; (2) the necessity of spending time, money and energy on finding out how to employ these weapons in a sea environment; (3) the necessity of spending time, money, energy on submarine experimentation, and the production of standard engines and types proved in war, which in 1923, six years after the demonstration of their practical utility and existence, we are without. It is a curious fact that out of a $360,000,000 yearly appropriation there is appropriated directly for submarine experimentation not one penny. Fortunately, aeronautics has an experimental appropriation, and so a constructive continuing policy and progress, and to it we can lay in large measure such things as the *ZR-1*, the catapult, the aircraft engine development, and the new navy types of aircraft. There remains but the energy and vision of some naval commander to develop air power at sea, and give and make aircraft take its place in the fleet. For the first time in the history of our modern Navy, we are in a position to lead in strength and employment in a major tool of naval warfare. We have largely been a Navy of adapters and imitators in the development and use of types, as warranted by our unimportant national position and lack of a professional personnel trained in a common school of warfare; we have been treading slowly, carefully, and perhaps timidly. Having presumed to or having acquired a major *rôle* in world affairs,

it behooves us to lead and not follow wherever openings can be made or found.

To return from this digression to tactics and tactical systems, it is essential for the student to remember that systems are necessary but not immutable, that they are means and not ends, and that the man who would pretend to wage naval warfare must be grounded in the principles and applications of them before he can turn with discretion and sense to the existing systems in his service. Our systems and methods purport to represent the best practice in our service, and grounding in them, not blindly but intelligently, is the duty of each individual and part of the job of the War College, and each commander of a force that conducts training. When anyone has clever ideas that do not appear in the system, he should not break down the existing order by using them unofficially, but after experimenting with them, should present them, and get them included in the official manual if they can stand up against naval opinion and a service test at sea. The sea job is practical training, testing, and indoctrination in the existing system; the department job is to assist in the training of individuals, to provide the training tools, and to keep the system up to date and in conformity with facts.

Probably the brightest page that has been turned in our Navy in recent years, in an administrative way, is the formation of the office of fleet training, with a major division of tactics. We have chased many a butterfly by the wayside in this Navy, and have been diverted from our real goal, in following blindly and far such things as material development, technical training, gunnery, engineering performances, athletics, and others; all of which are contributory to the main theme of waging war, which is made up of forty per cent skill and knowledge of strategical and tactical principles and methods, forty per cent skill and knowledge in managing men, and twenty per cent production and operation of material. With a just appreciation of our deficiencies in training for war, it behooves the naval profession to give the new office not only its best wishes, but also its loyal and continued support.

DEVELOPMENTS IN THE STUDY OF OCEAN CURRENTS, OR HOW OCEAN CURRENTS ARE DEPICTED

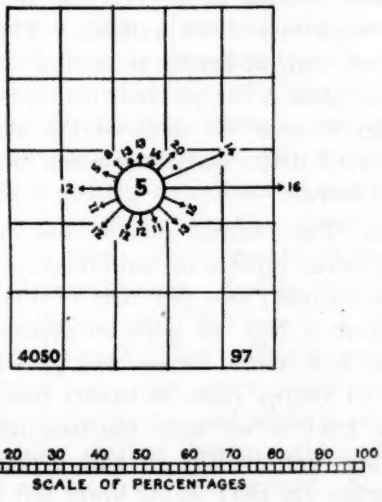
By Theron D. Wilson

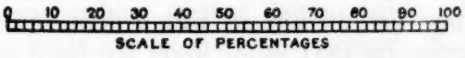
OCEAN currents exercise a very important influence not only upon climate but also on commerce. The practical seaman today cannot be satisfied with merely general knowledge about an influence which so materially affects him. But there has been so much controversy about the causes of currents, very little of which has had to do with how to take advantage of them, that the study of currents has been at a standstill for several years waiting for facts. Yet until the science of aeronautics has advanced so as to cause ocean travel to be frowned upon, the circulation of waters will be a subject for study. So much has been written about the existence, kinds, and causes of ocean currents that it would be a waste of time to try to cover ground that has been so carefully gone over. A few facts have been arrived at.

Practically every five-degree square in the North Atlantic Ocean has been crossed in any one month of recent years in some direction, and a great number of observations of the conditions in the majority of squares is available to the Hydrographic Office from which to compute an average current for every portion that ships have navigated. Reports have been received for several years from United States naval officers and from mariners of all nations dealing especially with currents and in most instances on forms provided.

An ordinary current report from a mariner gives only an average current found by him for a certain run and under the circumstances surrounding him at the time, or under *special* circumstances. But when hundreds of reports of currents flowing over one position are taken, an average of all those currents is a current made up of hundreds of different sets of circum-

stances. Such a current is an "average current under average conditions." The baffling questions raised on account of wind, declinations of the sun and moon, sizes and shapes of reporting vessels, inaccuracies of navigation, barometric pressures of the atmosphere, temperatures of the water, salinity, etc., are summed up and included in the average. But by the laws of least squares the great compendium of special inaccuracies grows smaller as new averages are added and finally such a current results as will be of material value.





Currents of this kind are to be presented on a chart which the Hydrographic Office is now preparing, and which will indicate to the mariners a definite result from their recorded observations. Such currents will be shown that shipmasters will be able to choose routes that will have favorable currents and shorten their voyages and thus save millions of dollars every year for the owners of the vessels.

By a current rose the chart will picture the conditions in each five-degree square. This has been decided upon as the best way to present the essential usable features of a heterogeneous mass of information upon the subject. The plan has grown out of and is built upon the developments of a study of these matters by oceanographers and nautical assistants conducted since

the time of Maury. The current rose, in blue color, in each five-degree square will show the character of the currents in that square as computed from a certain number of reports from mariners. The figure on page 401 is an illustration.

The currents are concentrated upon sixteen points. Reports of no currents found are indicated by the figure within the circle. The figure in the lower right hand corner of the square is to represent the total number of reports selected from which the current rose is made up. It includes only reports of no current and of currents flowing in the various directions during the month, that were considered reliable. The arrows give the direction of set, and, in length as applied to the scale of percentages below, show what per cent to expect in a given direction. The figures near the ends of the arrows are averaged from the reported drifts and show about how many knots per day the water flows.

For example: The attached current rose should be read thus: Out of ninety-seven reports of conditions in January, five were reports of no current; two per cent of the remaining ninety-two reports gave a N'ly set with an average drift of thirteen miles in twenty-four hours; six per cent gave a NE'ly set with an average drift of twenty miles in twenty-four hours; fifteen per cent gave an ENE'ly set with fourteen miles average drift; twenty-eight per cent, an E'ly set with a drift of sixteen miles, etc. The number (in red) in the lower left hand corner of the square is the number of the square; by the illustration, 4050 is the square at forty degrees latitude, fifty degrees longitude.

The method of computing the figures is complicated but interesting in that it indicates the significance of the credit given to the reports. The high points can be briefly stated.

Reports are received in batches and after being circulated through the Office are deposited in the Section of Pilot Charts and Ocean Currents. They are separated into piles corresponding to the months in which the first observations were taken. The pile for one month, say January, is then charged in a January ledger which has sections devoted to the various five-degree squares. The noon positions or the positions up to which the currents are determined are charged to the squares in which

the positions fall. The dates set opposite the currents and the Hydrographic Office numbers of the documents (placed thereon in the order of receipt) are thus recorded for every current for every square. The documents are then filed according to their numbers.

When a current for any square is to be computed, the document numbers charged to that square are transposed from the ledger in chronological order by the dates on which the currents were observed. The documents are then extracted from the files. When the documents are in order one is ready to concentrate the information. By referring to the dates on the list the positions and currents on any document can be found readily without reading over the whole report. But at this stage it becomes necessary to determine how much credence should be allowed to the currents set down on the document. The amount of discretion necessary and the experience of the worker cannot here be portrayed, but assuming that the current report is accepted, notice must be taken of the weight of the currents in relation to the five-degree squares. For in some instances the ship has only crossed the corner of the square, in other instances the ship has crossed the square diagonally, or possibly the ship has reported a current for a run which ended upon its arrival near the outer edge of the square and while in the square was prevented from making further determination. Obviously all the currents should not have the same weight. So the positions are plotted on a chart or chartlet which is marked into one-degree squares and the current is given weight corresponding to the number of one-degree squares over which the run was made in the five-degree square.

By the use of forms the currents found in every one-degree square are tabulated with their drift and, if unusual, their surrounding conditions, and preserved for future manipulation. When all the documents referring to a single five-degree square have been gone over, another form is taken, the currents are collected by directions, the drifts are averaged, and the percentages are determined. Then the current rose is drawn and its evolution is complete.

Truly there has been much monotony to the task of compiling an elemental order out of the chaotic flow of mariner's reports

and of plotting and transposing individual currents. But with the gist of the old proverb, "Inspiration stands tiptoe on the back of pure drudgery," the task has developed a plan that ought to, and probably will, renew and instill interest in this special branch of oceanography about which the world is only generally acquainted but which with every increase in knowledge will become more valuable to shipmasters.

REAR ADMIRAL CHARLES WILKES AND HIS EXPLOITS

By Mary H. Krout

Editor's Note: Civilians are prone to look upon the Naval Officer as one whose training is for war, and whose occupation in time of peace contributes little to the development of his country or of the world. The brief sketch following tells something of the exploits of an officer of the old Navy who contributed not a little to the exploration of the world in the days while there still remained uncharted areas in the Seven Seas.

NOTWITHSTANDING his remarkable career, it is extremely difficult to find any lengthy or definite account of Rear Admiral Charles Wilkes, of whom, consequently, the average American citizen knows very little.

He was born in the City of New York, April 3, 1798, entered the U. S. Navy as a midshipman when fifteen years old, and was attached to the squadron of Commodore Macdonough in the Mediterranean in 1820, where he rendered very efficient service. Two years later he served with Commodore Stewart in the Pacific, 1821-3, where, as a reward for distinguished ability, he was given a separate command. A fine portrait in Frank Moore's *Heroes and Martyrs,* a collection of sketches of military and naval celebrities prominent in the Civil War, presents him as he was in middle life; a man of distinguished appearance, with fine, piercing eyes, strong but somewhat irregular features, the mouth expressing great firmness and resolution.

He was absolutely fearless, of indomitable courage, as his varied career sufficiently proves. He possessed a wayward impulsiveness, however, that made him occasionally disregard the necessary discipline of his profession, ever more incumbent upon an officer than that required of his subordinates.

Considering his achievements, however, it is strange that he has been so apparently forgotten by the present generation.

Indeed, when his name is mentioned, if recognized at all, it is always in connection with the unfortunate "Trent Affair,"—the

one episode in his career that stands out with any prominence—that and no other.

In 1820 he was promoted to the rank of Lieutenant, and four years later assigned to the depot of Charts, by the Navy Department, his interest in scientific investigation having developed at an early age. To carry on his study in this direction, he constructed an observatory in his garden, with stone piers to support his instruments, but was ordered to dismantle it, "as such a structure on private premises was illegal."

After a survey of St. George's Bank, which always had been a menace to navigation—a duty well performed—he was given command of an expedition to the Antarctic Circle. This had been contemplated for some time, and was finally authorized by Congress, but without much inquiry into the cost of fitting out such an undertaking.

The squadron has been described broadly as "five unsuitable ships, of which the *Vincennes*, the largest, a corvette of some 500 tons burden, was the flagship; the *Flying Fish*, the smallest, of but ninety-six tons. Almost nothing was known of the latitude to be visited, but it was naturally suspected to be a region of wild gales, ice, and blinding snowstorms, almost isolated the greater part of the year. The command had been offered several officers, before it was tendered to and accepted by the indomitable Wilkes. The main object of the expedition was announced to be the safeguarding of American whale-fisheries, the promotion of commerce and the safety of future navigation, with the extension of scientific knowledge in general.

The squadron sailed from Norfolk, Va., August 18, 1838, by the way of Madeira to Rio Janeiro, thence to Terra del Fuego, to be the base during the investigation in that latitude. Here the squadron was divided, Lieutenant Wilkes in command of one division, and Lieutenant Hudson of the other.

Lieutenant Wilkes had, it appeared, been left somewhat free, but had been ordered strictly to keep his instructions and discoveries to himself—not to be shared by anyone not connected with his command. It was an order which, unfortunately, he disregarded, disobedience which subsequently he had cause to repent.

The *Vincennes* was left temporarily at Terra del Fuego, while Lieutenant Wilkes sailed with two small vessels, the *Porpoise* and

Seagull, to the east, discovering three small islands and sighting Mt. Hope. The two vessels, encountering heavy ice, were forced to return to their base. The expedition continued then to Valparaiso and Callao, making the passage safely through the Straits of Magellan, his scientific investigations there relating chiefly to the height and velocity of the waves around Cape Horn.

At Valparaiso the interior of the surrounding country was explored, some important scientific data being obtained. The native dances were minutely described by Lieutenant Wilkes, the dress of the dancers, both men and women, and while he commended the morality of the latter, he confessed that "he could not say that they were beautiful." Peru was also explored and Lima was described at that time, 1839, as "a place of neglected walls and tenements, with an absence of life and stir among the people, and everywhere evidences of decay. No new buildings," he believed, "had been erected for forty years, and it had, from the hills, to the eye of a stranger, the appearance of ruins." Here, too, he observed the people with interest, describing the peculiar dress of the women which he said, "however fitted to cover intrigue, was not adapted to the display of beauty, though it enabled ladies to go abroad without an escort." While he failed to see their faces he remarked that "their walk was graceful and they usually had small hands and feet."

From South America the squadron proceeded to the Pacific Islands south of the Equator, the Pawmotos Group, Tahiti and Samoa. At each point valuable information was obtained for the government, Sydney being the last port visited prior to the departure of the expedition to the Antarctic area, December 26, 1839. Upon their arrival, the ships were to proceed separately, Lieutenant Wilkes with the *Vincennes.* Additional and sufficient supplies had not been obtained in Sydney, and, in addition to the heavy duty required of them, with the increased unfitness of the ships, the crews suffered severely from cold and lack of proper food and clothing, exhausted as they were, daily, by the difficulty of navigating through the thick ice. It was realized that there was no possible relief, and that the duty to be performed must be carried out in spite of such obstacles, as speedily as possible.

In all the difficulties and hardships encountered, Lieutenant

Wilkes is said to have shown himself possessed of indomitable perseverance, unfailing resourcefulness and admirable seamanship.

On January 20, 1840, the expedition entered a deep bay from which land was distinctly visible, both to the southeast and southwest. It had been sighted in the evening and in the clear light of the following morning this fact was fully established. His entry in his journal for that day was to the effect "that land had certainly been sighted where those on board the *Vincennes* had believed it to be." This was corroborated by Lieutenant Hudson on board the *Peacock*, who described it as "an immense mass that had every appearance of land, towering over an ice-island apparently 3,000 feet in height, grey and dark, divided into two ridges throughout its entire length, and covered with snow." This was their first view of the Antarctic Continent!

They sighted it again in their continued cruising and at one point mud was brought up in soundings from a depth of 320 feet. Similar entries were made in their journals during their slow progress, with little variation, from day to day. The actual coast was inaccessible, shut off by a great unbroken ice-field through which there was no passage for the ships, nor was there any possibility of scaling the almost perpendicular walls of ice to reach the levels above, had such an opening been found. In addition to this difficulty, the heavy gales that prevail in that region, snowstorms and thick fog forced the ships to put out to sea from time to time, though they returned to their persistent quest again—an opening in the ice-field by which the absolute certainty of their discovery, an Antarctic continent, could be established, which would be, inevitably, contradicted by rival explorers.

In a lengthy extract from Lieutenant Wilkes' *Journal*, of which the above is the substance, Major General A. W. Greely quoted further, referring to the bay previously mentioned. "I made this bay (called Piper) in longitude 140°–30′ and now that all are convinced of its existence (an allusion to the entire squadron) I gave the land the name of the Antarctic Continent. Sounded and found thirty fathoms."

They were shortly driven from Piper by the official report of

the medical officer who stated that "a few more days of such exposure would reduce the number of his crew by sickness to such an extent as to hazard the safety of the ships and the lives on board."

In spite of this warning, Lieutenant Wilkes continued his cruise westward, still sighting land—very mountainous and covered with snow.

A landing was finally made on an island, February 13, 1840, where stones and boulders were imbedded, the actual coast being now but eight miles distant. Before returning, he had followed the forbidding ice-barrier throughout a distance of 1,700 miles.

Mr. Edwin S. Balch, in his account of this discovery, said: "The cruise of Wilkes will remain among the remarkable achievements of all time. No such achievement has been accomplished in the annals of the Arctic or the Antarctic. With unsuitable and improperly equipped ships, amid gales, snowstorms, and fog, Wilkes followed an unknown coast-line exceeding in length the Ural mountain range, which makes the result of his cruise so important, for he did not merely sight the coast-line, but he hugged it for such a distance as to make sure that it was continental in dimensions. It is only the exact truth to assert that the discovery of the existence of the Antarctic Continent belongs to Charles Wilkes."

The explorations of the squadron within the Antarctic Circle continued until February 21, when the increasing sickness forbade further progress, and the squadron returned to Sydney. Calling at Hobart, Lieutenant Wilkes transmitted his report to the Secretary of the Navy, in which he stated modestly and briefly:

"It affords me much gratification to report that I have discovered a large body of land within the Antarctic Circle, which I have named the Antarctic Continent, and refer you to the report of our cruise and accompanying charts enclosed herewith for full information thereto."

For some time Lieutenant Wilkes' discovery was denied by French and English navigators, the latter being especially stubborn in their rejection of his claims. Sir John Clark, a nephew of the British explorer, Sir John Ross, had sighted land at a different point a few months later, and upon his report the English

endeavored to lay claim to Lieutenant Wilkes' previous discovery. They continued to reject his statements, substantiated, as they were finally to learn, by accurate charts, after which they were forced to admit that the honor of the discovery of the continent was his.

From Sydney Lieutenant Wilkes sailed to New Zealand, which as elsewhere, was also partially surveyed and explored. The southernmost of the Fiji Islands were visited, Wilkes describing the natives, now a tractable and civilized people, as "the most savage and degraded specimens of the human race. Their color," he wrote, "is nearly black and they are entirely naked except for a band around their loins and head. They possess no wealth and to them a whale's tooth is the most inestimable of treasures."

Here mountain summits were climbed and interesting mineral and botanical investigations made by the naturalists with the expedition. All the islands of the group were surveyed without interference, the King, only, taking offense. He, however, was pacified after he had been recognized with a salute when he came on board the *Vincennes*.

Two of the officers of the squadron, unfortunately, were murdered by the natives, Lieutenant Underwood and Midshipman Wilkes Henry, a nephew of the commander. The crime was punished with what must be admitted was excessive severity, followed by the enforced submission of the natives.

After cruising in those waters the expedition sailed for Hawaii, arriving at Honolulu September 30, 1840. The natives of these islands had suffered, morally and physically, in previous years, from contact with the rough crews of whalers and escaped convicts from the penal colonies of Tasmania and Australia. Wilkes' squadron, however, was warmly welcomed by both the Hawaiians and the American residents, its officers, able and well-bred, a strong contrast to the objectionable class that preceded them.

Lieutenant Wilkes truthfully pronounced the Hawaiians far superior to any of the natives of the other groups of islands that he had visited.

In December, 1840, the squadron left Honolulu and proceeded to Hilo, on the island of Hawaii, where an expedition to the summit of Mauna Loa was planned. The supervision of this was left to a Dr. Judd, who had accompanied the squadron from

Honolulu. He was a man of great intellectual ability, a close friend of the King, Kamehameha III, who had held many important offices and through whose influence with England and the United States the Islands were afterward protected from threatened foreign aggression. He had narrowly escaped death in helping the scientists of the expedition in their previous work at the crater of Kileaua. While dipping up some molten lava, the supposedly solid crust under his feet gave way and he was with the utmost difficulty dragged to the ground above by a native lying at full length on the verge of the pit. Both were severely burned—but his valuable specimen was saved!

The ascent of Mauna Loa on Hawaii, seldom undertaken even in this day, "for making observations on the vibrations of the pendulum," Mrs. Judd, who accompanied her husband, pronounced "the crowning exploit of the expedition."

The members of the party, with their Hawaiian helpers, had made their way through the dense tropical vegetation of the lower slopes, over the rugged lava beyond, and the broken stretches just below the summit, carrying with them their heavy apparatus, materials for building a house, supplies of food,—a distance of sixty miles. Dr. Judd went with them as interpreter, giving them in other ways valuable assistance. The weather proved stormy, as it is, usually, during that season (January), but she said: "Cold and hunger, sore feet and fatigue, were obstacles overcome by the indomitable courage of commander and men. Captain Wilkes pitched his tent on the summit, nearly 14,000 feet above the level of the sea, where he remained three weeks and completed his observations, in spite of storm and tempest, which, in two instances, prostrated their tents."

It may be asked why seamen from the squadron had not been employed as carriers, but, enervated as they were by previous hardships, they could not have made such an ascent, carrying heavy loads in an atmosphere increasingly rarified as they approached the summit, to which Lieutenant Wilkes and his assistants seemed able to adapt themselves.

After quitting Hawaii, the expedition re-crossed the Pacific to the coast of California, where Lieutenant Wilkes journeyed inland, afterwards embodying his survey in a book entitled *Western America*. He then sailed southward, visited the Philip-

pines, Borneo, the Cape of Good Hope and St. Helena, which no navigator in that day passed by, and arrived in the harbor of New York after an absence of nearly four years, June 10, 1842.

It might be supposed that the great discovery he had made, his accurate reports of many islands unknown, or little known, up to that time, the vast amount of scientific information obtained by the qualified staff, not only under his command, but whom, in certain fields, he personally assisted, would have entitled him to very distinguished honors when he returned to the United States.

But his fate was that of many other great explorers—severe reproof, many of his reports questioned, notwithstanding the fact that there was abundant proof of their reliability. He was placed under arrest, specifically charged with cruelty, falsehood, and discreditable acts, one of which was, "while yet a Lieutenant wearing the uniform of a Captain."

The cruelty of which he was accused related chiefly to the discipline of some of the seamen for desertion. The commander had also disobeyed very stringent orders that he was to keep his discoveries secret—to be made known only to the U. S. Government. Disregarding his instructions, he sent to an English navigator, who followed him in his Antarctic exploration, his charts and letters relating to his work. This violation of orders was misplaced generosity as well; his discoveries being afterward omitted in English charts "when those of every British sealer had been indicated." It was afterwards tardily admitted, however, that "Wilkes' soundings still remained a guide to the limit of the continental plateau."

To the disappointment of his jealous enemies, few of the serious charges brought against him were sustained, but, anticipating deserved honor and recognition, he must have suffered cruelly the chagrin of keen disappointment and the humiliation of glaring injustice.

His account of the long cruise: "A Narrative of the U. S. Exploring Expedition during the years 1838, 1839, 1840 and 1842," which appeared in five volumes, was followed by eleven volumes relating to the scientific labors of the expedition, while the last of his published works, *Theory of the Winds*, appeared in 1856.

He was not advanced to the rank of Captain until sixteen years after his discovery of the Antarctic Continent.

His residence was in Washington, during which, as always while on shore, he was occupied with affairs connected with his profession, and while there another mention is made of him by Dr. Judd who had given him such efficient aid in his investigations on Mauna Loa. In 1849, following unjust claims against the Hawaiian Government, made by Patrick Dillon, Consul for France, Dr. Judd was sent with the two princes, Alexander Liliho and Lot Kamehameha, to ask for the protection of their country against future encroachment from both England and France. The mission was successful and Dr. Judd returned by the way of Washington where the two young princes received much attention. He then renewed his acquaintance with Captain Wilkes —he now having acquired that title—a long-withheld promotion.

Captain Wilkes apparently devoted much time in showing Dr. Judd and the two young Hawaiians many places of interest about the capitol and in the various departments. In the Patent Office the hardened cake of lava which he had procured for Captain Wilkes with such danger to himself in the crater of Kilauea long before, was pointed out.

In November, 1861, following the outbreak of the Civil War and after months of painful doubt and discouragement, the North was electrified by an event which has passed into history as "The Trent Affair," in which Captain Wilkes was the central figure.

Of this, Charles Francis Adams, son of Charles Francis Adams, U. S. Minister to Great Britain at that time, has written: "In the month of November, Charles Wilkes of the U. S. Navy furnished the disheartened Federal Government its first real thrill."

In command of the sloop-of-war *Jacinto*, Captain Wilkes arrived at Fortress Monroe with Messrs. Mason and Slidell, who had been removed from the British mail-steamer *Trent* on the high seas, a neutral ship of a neutral nation, with no official warrant for such an act.

Confederate agents had been sent to England previously, hoping to secure recognition for the Confederacy, but had not succeeded. The two Commissioners had been furnished creden-

tials to be presented either in England or France, whichever country they might be able to reach first. Both men were former U. S. Senators, Mason from Virginia, and Slidell from Louisiana. The Southern ports had been closed by blockade, but the two envoys succeeded in escaping from Charleston on an English blockade-runner. They reached Havana safely, where they secured passage on the *Trent,* sailing under the flag of a professedly neutral nation and therefore legally immune from delay and search.

Captain Wilkes—as was now his rank—learned of the escape of the Commissioners from Charleston and their reception on board the *Trent,* while cruising in Cuban waters. He determined to overtake and board her and remove the Confederate envoys as his prisoners.

This he accomplished, coming up with the *Trent* in the Bahama Channel. A shot was fired across her course and the American flag run up. The *Trent* kept on her course until a shot across her bow forced her to stop. Lieutenant Fairfax was then sent on board, the surrender of the two Commissioners demanded, the officers and passengers of the *Trent* protesting. They were hurried to the boat waiting alongside, and the *Trent* was permitted to resume her voyage. The news of the capture raised the greatest excitement throughout the United States, furious rage within the Confederacy, and proportionate, if short-lived, enthusiasm in the North, where it was temporarily forgotten that Captain Wilkes' act was in violation of a principle whch led the United States to declare war against England in 1812.

The North failed to remember this—except the few of her more sober-minded citizens, and the rash act of Captain Wilkes was at first lauded with extravagant praise. The press overwhelmed him with congratulations; Governor Andrews of Massachusetts approved his course at a public dinner; the Secretary of War concurred in his commendation and he was voted a medal by Congress. Only the small minority realized the gravity of the situation.

It was afterwards learned that Mr. Seward, from the first, notwithstanding the illegality of their seizure, opposed the surrender of the prisoners, which was delayed as long as possible.

Meanwhile, upon his return to London, the American Minis-

ter, Charles Francis Adams, who had remarked of his obduracy that "Mr. Seward's ways are not those of diplomacy," [1] received from Lord John Russell, Secretary of State for Foreign Affairs, a request to call upon him at his residence to discuss the situation. Realizing its gravity, Mr. Adams overlooked considerable official discourtesy, and complied with the Secretary's wish.

He was received very cordially and in their conversation Lord Russell let it be understood that the British Government did not desire war with the North, and would avoid it if possible, which was the ultimate result of their conference. As an added trouble, the Prince Consort, who had always great influence with the Queen and was friendly to the Union, died in the midst of the difficulty.

At last, upon sober reflection, it was realized in Washington that the seizure of the Confederate Commissioners was unlawful. They were accordingly released and permitted to go their way.

It cannot be said that Captain Wilkes' bold transgression of maritime law was altogether deplored by the Federal government, and the discipline which followed was apparently not very drastic, for in the re-organization of the Navy in 1862 he was promoted to the rank of Commodore and given command of a flotilla in the James River. He was afterwards, either in a spirit of defiance or a lack of finesse, sent to the West Indies in command of a squadron for the protection of American shipping in those waters. It was an order greatly resented by the English, to whom Commodore Wilkes was still *persona non grata*, and the order was construed as retaliation for the final re-adjustment of the Trent Affair, which was by no means forgotten.

It will be recalled that after his return from the successful Antarctic Expedition he was reprimanded for having given important facts relating to his discoveries to a British officer of a rival expedition, who arrived in the Antarctic while the American squadron was still there. At the close of the Civil War, what must have been a too generous disposition led him again into the same error, permitting important documents in his keeping prematurely to be made public.

[1] *Life of Charles Francis Adams*, by his son, Charles Francis Adams, pp. 218-20-26.

For this offense he was court-martialed, suspended and placed on the retired list.

He remained in Washington and died there February 8, 1877. He had lived through a long and adventurous career, entering the Navy as a lad of fifteen. It is probable that there never have been so many assertions, contradictions and re-assertions, in regard to one man. But his undeniable achievements were those of a character pre-eminently heroic; abounding in great knowledge, but handicapped by rashness and lack of forethought; sincerely devoted to his country, but unwise in the exercise of his loyalty; a man of great achievements, but, today, forgotten.

THE STAFF EQUALIZATION BILL

By Commander J. S. McCain, U. S. Navy

IN JUNE, 1923, the Navy Department convened a board for the purpose of evolving a method for the equalization of the promotion of staff officers with the promotion of officers of the line. The board was advised that the following principles were held to be fundamental: That staff officers should have the same promotion, or the same opportunity for promotion as officers of their own time in the line; that qualified staff officers should be advanced at the same time as their qualified contemporaries in the line are promoted; that staff officers should suffer the same hazard of non-advancement, and the same penalty for failure to be advanced as may be suffered by their contemporaries in the line, this parity of opportunity and penalty to be maintained from the date of entry into the service to the date of separation therefrom. The Equalization Bill was drawn up in accordance with the foregoing principles.

At the present time all staff officers, except chaplains, are now promoted to and including the rank of lieutenant commander, with their running mates in the line. The Equalization Bill applies the same rule to chaplains and extends the principle through all selection ranks. That is, the bill definitely assigns a running mate to each staff officer who is now in the service and provides for the definite assignment of running mates to staff officers who may hereafter enter the service. When the running mates of staff officers or line officers junior to said running mates are selected for promotion, all such staff officers immediately become eligible for selection. A fraction of the staff officers who thus become eligible may be promoted. This fraction is arrived at in such a manner that it represents the opportunity or the chance of the line officer contemporary.

The first difficulty, naturally, in a scheme of this kind was a specific and just rule or rulings for the assignment of running

mates to staff officers now in the service. Generally speaking, all staff officers now in the service were, in accordance with laws then in force, assigned on entry into the service a line officer with or next after whom they took precedence. These laws have been changed or modified from time to time, a proof, doubtless, that they did not give satisfaction.

It would have been ill advised, however, to enter into the phase of correcting what may or may not have been just and correct at the time that each staff officer now in the service entered the service. That is a vexatious question and one that is less profitable to tinker with than it is to let alone. A balance of a sort was established when each staff officer entered the service and that balance, in spite of various rulings on, interpretations of, and amendments to the laws themselves, has on the whole been maintained at the present time. It was, therefore, determined as a guiding principle that the line officer with or next after whom a staff officer, then or eventually, took precedence upon original entry into the service, should be designated as that staff officer's running mate. Under the terms of the bill, one or two exceptions were necessary; one being the case of the medical officers appointed prior to March 4, 1913, who, under a strict application of the "law in force" rule, would have been assigned as running mates, line officers junior to the line officers assigned as running mates to medical officers appointed subsequent to March 4, 1913, and, therefore, junior in the medical corps to medical officers appointed prior to March 4, 1913. Further, it was necessary to provide for changes in running mates to accord with the various mishaps which have occurred to staff officers or to the running mates of staff officers. The same provisions effecting changes in running mates are made applicable to staff officers who may hereafter lose numbers or be passed over and to their line officer running mates who may hereafter be passed over or lose numbers.

Having decided upon the method of assigning running mates, it was next necessary to determine in what manner the chance of the line officer for selection should be arrived at, so that upon application of this chance to staff officers they would have precisely the same opportunity for promotion at precisely the same time. The chance of line officers for selection to higher grades from 1916 to the present date is easily computed. That chance

is sixty-one per cent for captains to rear admiral, ninety-one per cent for commanders to captain and ninety-one per cent for lieutenant commanders to commanders. The bill provides for an equalization board which delivers this chance at once to all of those staff officers whose running mates are in a higher rank than themselves.

The determination of the line officer's chance for the future is a matter which is very much more involved. Nearly all of the line officers, at the present time, in selection ranks are eligible for selection to the next higher rank. For instance, the names of nearly all lieutenant commanders are sent to the line selection board as being eligible under the law for selection to commander, but how much chance has the junior lieutenant commander under such conditions? Also, if there are thirty vacancies to be filled, how much chance has number sixty on the list of lieutenant commanders?

After some study with problems such as the above, it was decided that there was no way of figuring a line officer's chance until the line officer had been actually selected or passed over by the board; then his chance before that particular board is a simple matter of mathematics. However, line officers have been passed over and will be passed over in the future and after being passed over, have been selected and sometimes have been selected after being passed over several times. Therefore, the result of one line board does not give any particular line officer's exact chance for promotion. Further, the line board may go down several numbers to select up an officer who, but for selection on that occasion, would otherwise retire for age in grade. The next year it may return and pick up by seniority the officers so passed over.

It was finally decided that the exact chance of any line officer would be most nearly approximated by averaging the actual chance of line officers before four successive line boards. Each line officer's chance was thus determined to be the proportion between the number of officers selected by four successive line boards, to the number of officers considered by the boards, considered in this case, to be interpreted to mean not merely eligible, but that the officer so considered has either been passed over or promoted.

This proportion established by four successive line selection boards will be applied to staff officers whose running mates are promoted or passed over by the last preceding line board. Perhaps an illustration would be clearer:

(1)	(2)	(3)	(4)	(5)
A	C	C	C	**C**
B	D	D	D	D
C*	G	G	G	G
D*	H	H	H	H
E	J	J	J	J
F	A	E	E	**E**
G*	B	I	I	**I**
H*	E*	L	L	**L**
I	F	M	M	M
J*	I*	O	O	O
	K	A	F	**F**
	L*	B	K	K
	M*	F*	P	P
	N	K*	R	R
	O*	N	T	T
		P*	A	B
		Q	B*	N
		R*	N*	S
		S	Q	V
		T*	S*	Y
			U	**A**
			V*	**Q**
			W	**U**
			X	W
			Y*	X

In the table, column one shows the action of the fourth preceding line board. That board considered officers from A to J, selecting C, D, G, H, and J; passing over A, B, E, F, and I. Each line officer's chance before that particular board was fifty per cent. The action of the third preceding line selection board is illustrated in column two. This board considered officers from

A to O, selecting five and passing over five. Each line officer's chance from A to O before this board was fifty per cent. Similarly for the second preceding line selection board. The action of the last preceding line selection board is illustrated in column four and the combined action of all four line boards is illustrated in column five. The last preceding line board considered officers from A to Y, promoting five and leaving five. Staff officers whose running mates range from U to Y become eligible as a result of the action of the last preceding line selection board. Each such staff officer has delivered to him as his opportunity for selection twenty-twenty-fifths, or eighty per cent, as illustrated in column five.

The line officer B's chance, who was passed over by three boards and picked up by the last board, is also twenty-twenty-fifths, and A's chance, who was passed over by four boards, is likewise twenty-twenty-fifths, or eighty per cent. Therefore, each staff officer becoming eligible when Y is selected, enjoys the same chance as the line officer who was passed over by four boards and not promoted, or as the line officer passed over three times and then promoted. The assumption here is that U, W and X, or those line officers who were first passed over by the last preceding board, will have in the future the chance which line officers A and B have already had. Therefore, a staff officer becoming eligible for the first time receives in full the chance of the line officer who was first considered by the line selection board at a date four years prior to the date of the staff officer becoming eligible. This chance is assumed to be the chance which will be built up in the future by the line officers of his own immediate time, i. e., U, W and X. Thus, a staff officer gets at once the total chances which accrue to a line officer after four selection boards. It is not believed that a fairer scheme could be devised.

The action of four line selection boards was taken not only to insure that the staff officer should get the full opportunity which should be his but also because the average thus obtained would modify the possibly erratic action of any particular line board. Further, promotion conditions in the line when only four boards are averaged, will be quickly reflected in the staff corps, which is, of course, highly desirable.

The following tables show the estimated effect on the corps as

indicated. Present humps in the rank next below are indicated in a given rank by an increase in figures from the present authorized number to the number which would result from the equalization bill which appears under columns 1923 and 1924. These humps must be worked completely through the ranks above before an average condition is reached. The average condition is a distribution in the staff corps in the same proportion as is the distribution in the line, namely one per cent rear admirals, four per cent captains and seven per cent commanders. This plainly cannot be obtained in any of the corps until the humps in those corps which have lagged behind are worked through the various grades, nor until the promotions in the line overtake those corps which are ahead. This will naturally take several years because in some corps there exist humps in the rank of lieutenant commander and this hump will continue to appear successively in the ranks of commander, captain and rear admiral until all such present lieutenant commanders have become separated from the active list.

The significance of the figures may be demonstrated. For instance, in 1930 the line will have fifty-five rear admirals. These rear admirals will be spread over an eight year age period and will be from fifty-six to sixty-four years of age. They will have graduated from the Naval Academy in the classes of 1889 to 1896, inclusive An estimate of officers of flag rank in the medical corps for the year 1930 is fifteen. That means that in the period from 1889 to 1896, medical officers entered the service in the proportion of fifteen medical officers to fifty-five line officers. In that same year there will be 200 captains of the line spread over a six year period from fifty to fifty-six years of age. During the six year period when these captains entered the service, medical officers entered in the proportion of seventy-four medical officers to every 220 line officers.

At the present time there are nearly 200 captains in the line. Fifty-two medical officers now on the active list have their running mates or line contemporaries among these 200 line captains. Ninety-one per cent of the fifty-two medical officers, or forty-seven, are entitled to have the rank of captain in the medical corps. Thirty already have that rank. The bill calls for the promotion of seventeen more officers of that rank.

Now if it is assumed that when the 200 line captains have disappeared from the active list as captains, seventy of them will have been promoted to rear admiral, the percentage of those promoted is seven-twentieths. Then of the forty-seven officers of the rank of captain in the medical corps, seven-twentieths, or sixteen, would be advanced to the rank of rear admiral.

Some of the effects of the bill are given herewith. The senior lieutenant commander of the construction corps under the proposed bill will not be promoted to the rank of commander in the construction corps until his running mate in the line is promoted to commander. Also the junior commander in the construction corps will mark time in his present rank and position until his running mate, who is a lieutenant commander in the line, is promoted to commander, when he will thereafter go up in precedence through the rank of commander with that running mate and be promoted to the rank of captain with him. All commanders of the chaplains corps whose running mates are lieutenant commanders will mark time in their present position until those running mates attain the rank of commander, when they will go up through that rank in precedence with their running mates and will be promoted to the rank of captain when their running mates have been promoted thereto. Thus, the bill compels officers of those corps wherein promotion has been more rapid than in the line, to mark time until their running mates in the line have overtaken them.

On the other hand it affords the same opportunity for promotion to staff officers whose promotion has lagged behind the promotion of their running mates in the line as has already been enjoyed by their line running mates.

COSTS IN NAVY YARDS

By Captain George H. Rock (CC), U. S. Navy

THE slack times in the shipyards and the reduced naval appropriations for new "Increase of the Navy" work in them and in the Navy Yards, and also, possibly, other causes, following the war, have led to many criticisms of the cost of work in Navy Yards and to discussions as to whether the real reason for their existence is understood—and accepted. It has been generally accepted that a sufficient number of Navy Yards on each coast are essential units of the fleet and must be kept up to the maximum of efficiency for that reason. The experience of the recent war should certainly be sufficient to convince anyone previously in doubt not only that our Navy Yards were equal to the demands made on them by and for the fleet, but that they produced results then far more cheaply than exactly similar results were obtained at the same time in private yards. That was the time large expenditures were being made and results counted. In making comparisons of cost of work in a Navy Yard with that in an outside plant, surely the comparisons should be of the cost of work done at that time in the yards and in private plants, the time when all kinds of work and up to the maximum capacities were being done, rather than now when work may be taken by an outside yard just to keep its organization intact and not to make a profit. The Government is also trying to keep its yards going as an adjunct to the fleet and the Government has no profit and loss account. Will the Government on a mistaken notion tend to keep the private plant going by giving it work at its lower bid and then in addition pay the expense of keeping its own Navy Yard going with little or no productive work? Obviously the Government cannot assume the burden of keeping both plants going. When times are hard and work is slack in private plants, the fact that articles can be bought or work can be done in them for less than the cost of those articles or that work in a Navy Yard is no indication that the Navy

Yards are inefficient, and is no reason for taking that work away from them. To take it away simply means further to reduce the productive labor of that yard, thereby increasing the overhead expense when referred to productive labor. This must be so as there are certain expenses, such as power plant, administration, upkeep, maintenance, etc., which after being reduced to a certain minimum, cannot well be reduced further, and the total of this expense, as the productive labor is decreased, must result in higher overhead rates. This then increases the total cost of future work. With the increased overhead by the gradual reduction in the amount of work assigned to the yards, an overhead will be reached which, especially when applied to small jobs with small productive labor involved, will, certainly when viewed by themselves, be prohibitive in cost, and the inevitable result will be the closing of the yards and the defeat of the primary purpose governing their existence.

We accept the Navy Yards as necessary. Then we should manage so as to keep them busy in times of peace. That will insure their efficiency at all times and their readiness in times of emergency.

Keep the Navy Yards busy is not a new cry. Much energy as well as paper has been spent many times from many yards recommending and suggesting certain action for that purpose. The two ways most frequently suggested are:

(a) Do all work on and for all Government vessels in Government yards to provide the continuity of work necessary for efficiency.

(b) Maintain a reasonable new construction program in the principal Navy Yards to ensure a sufficient skilled force for urgent or emergency work when needed.

The Government yards are called Navy Yards, but that does not mean they must be used for the Navy Department, only. They are equally well adapted for work on and for all Government vessels, and they are exactly as well adapted to do work on vessels under the other departments of the Government as on vessels under the Navy Department. Also the Navy Department should be no more concerned than are the other departments of the Government that Navy Yards be efficient. All officials in the Government service are vitally concerned in the efficiency

of all Government plans. That's what we are all working for, an efficient Government, and that must be accomplished by having efficient parts. It should not be difficult to convince the other departments of the Government that the Navy Yards will make a better showing if they also send all their work to them. There should be no dissatisfaction caused by service rendered. There is a sensible priority which can be established based on the needs of the Government, and there need be no cases of delay of any moment. In time of war when each department would insist on the urgency of its own work, there would be no more difficulty than in times of peace. There would simply be management of more work by a larger personnel spread out in more private yards, because in time of war a very large amount of work managed by the technical forces of the Navy Department must necessarily be assigned to private yards where it is controlled by the same technical management centered in the nearest Navy Yard. The opposition in the other departments of the Government to placing work in the Navy Yards could be overcome. The objection on the ground of delay in completion is referred to just above. The other objection is one of cost, and it may be difficult to convince an official in some other Government department that his work can be done in the Navy Yard for less than he can get it done in an outside plant. Nevertheless, under average conditions, that is a fact. It may not be so just now when many outside plants will take work at a sacrifice; but it is so year in and year out, through peace and through war, and matters of this kind should not be settled for the conditions existing in an abnormal time. There is no question that, during the war, work in the Navy Yards was much cheaper than in the private yards. There was opportunity to make some reliable comparisons, and they were made the subject of official reports. The savings were large in amounts, and should not be overlooked by those who are unfamiliar with Navy Yard conditions nor forgotten by those who devote most of their time to Navy Yard work. There is no criticism of the private yards. The result is one to be expected, and would be repeated under a similar emergency.

The maintenance of a reasonable program of new construction in each important Navy Yard was advocated originally by many

officers for the purpose of ensuring an organized force of skilled mechanics in times of emergency or of special urgency not constituting an emergency, which could be shifted at once from new construction to the emergency or urgent work, and which with the regular repair force would form a substantial nucleus about which the Navy Yard force could be expanded if and as required. The construction of new vessels in Navy Yards soon gave valuable data on cost and time of construction. Notwithstanding the criticism often heard of the actual cost of work thus turned out being compared with costs from private yards, it is clear enough that the total actual costs of Navy Yard work always could be obtained as the elements included and those not included in the costs were well known, and the figure to compare with the final cost of a sister vessel built in a private yard could be obtained easily enough. But without going further into that side of the question, the original reasons for assigning new construction work to Navy Yards, so far as pertains to ensuring the presence of a skilled force for sudden emergency work, could not be realized. The Department had to furnish Congress with the cost and time data of such Navy Yard work, and Congress compared such data with the corresponding figures on sister vessels built in private yards. Consequently the Navy Yard management had to make as good a showing as possible on new construction, and that required the force on new work be left undisturbed. That was the only way to keep down the cost and time, and while such ideal conditions could not be realized, yet the effort always was made to approach them. The fact that drawing off the men from new construction for about a month twice a year to overhaul the vessels of the fleet very largely extended the time and increased the cost of the new construction work, did not mean much. It sounded too much like a defensive explanation offered only when it was known the Navy Yard data did not show up well in comparison.

Figures could not be produced to show the enormous advantage to the Government of being able to have the fleet prepared as shown by its readiness for drills and target practice when required. This meant an efficient fleet; but there were no corresponding credits which could be applied to the cost and time figures of the vessel under construction. The difference result-

ing in the efficiency of the fleet might actually mean the difference between failure and success in time of emergency, but nevertheless, that difference could not be set down as so much in cost and time to apply as a credit on other work.

Regarding the cost of work in Navy Yards at the present time: that depends on the condition under which the yards must work and these conditions are not generally understood. In the Norfolk Navy Yard the direct labor is higher because at the present time and for many months the per diem wages in the yard which have been in effect since September 16, 1921, are twenty-six per cent higher than the per diem wages in most private establishments in the vicinity doing the same kind of work. Considering the actual wages paid, the number of days worked, and the amount of leave and the number of holidays authorized by law, the actual cost to the Government per working day is forty-six per cent higher than in the private yard. This difference in wages is quite sufficient of itself to account for the direct labor cost of Navy Yard work being considerably higher than that of similar work in a private yard.

Similarly, the indirect charges are largely beyond the control of the officials in charge of the work in the yards and depend on the accounting instructions issued by the Navy Department. At the present time we are working under accounting instructions effective July 1, 1922, under which the estimated costs used in competition with other yards, or with outside concerns, are appropriation costs. The indirect charges used in the appropriation costs are the shop indeterminate charges. These are the expense charges which at the time they are made are not lodged against any specific appropriation. They include:

Shop expense (does not include disability, depreciation and repairs to buildings).
Cost of power actually used.
Miscellaneous transportation.
Planners and estimators not chargeable to a specific job—also consumable supplies—miscellaneous labor such as janitors, etc.
General supervisors.

The following items of expense are determinate and therefore do not enter into the appropriation cost; but the industrial portions are used to obtain the job order costs:

Grounds and water front.
Supply Department.
Transportation—repairs to trucks, rolling stock, etc.
Power—repairs to buildings, etc.
Administration—pay of officers, clerical, drafting, etc.
All depreciation.

A commercial concern would include in addition to the above such items as interest on investment, rents, taxes and insurance.

Great stress is often laid upon the necessity of determining the indirect charges accurately and of keeping them down. The larger part of the indirect charges are practically fixed by other considerations than those of management; the location and layout of the plant; the relative positions of buildings as to convenience, suitability, etc.; the age, type, and extent of machinery and equipment; the location of the plant as regards the labor and material markets, etc. Navy Yards are laid out primarily to suit military needs, some yards dating back to the days of our Colonial Navy. The management must meet and work with the conditions as they are, and produce such efficiency as it can develop under the circumstances.

The shop indeterminate varies in the different shops from about thirty to 150 per cent. These rates are being criticized on all sides; but it is because they have not been analyzed nor understood. Also an examination of comparative expense statements of the different yards will show that widely different distributions of overhead expense, both determinate and indeterminate, as between military and industrial are made at the several Navy Yards by the local accounting boards. These distributions between military and industrial with small productive labor practically govern the shop appropriation rates. Also many critics do not realize that it is the kind or the method of computing rather than the amount of indirect expense that is really of importance. The items entering into the shop indeterminate are fixed by approved accounting instructions, but until they are fixed by one board for all Navy Yards there are essential differences in the

several yards and the results are not comparable. Many items are beyond the control of the management in a Navy Yard, except as to the amounts of the charges, such as supervisory expense and other expense charges, and operating charges which are really controlled more as direct than as indirect charges though included in the latter. The items making up the total of the shop indeterminate include many large amounts which in a private yard are charged direct to the job order and are not included in the indirect expense of the private yard. Therefore it must be apparent that no comparison can be made between the overhead charged by a private shipyard and which is entirely within the control of the management of that shipyard, and the corresponding figure applied to the direct labor in a Navy Yard. This must not be taken to mean that the total cost in a private yard should not be comparable with the total cost of the same job in a Navy Yard, considering the different rates of pay and the fact that the Navy Yards are required to allow about sixteen and six-tenths per cent time per year with pay while private yards do not give this gratuity. The Navy Yard actual cost figures are always available on the completion of a job and are reported to the Department.

The attitude of many critics that a high indirect means bad management with corresponding low efficiency is difficult to understand, after all that has been written on the subject by qualified experts. Probably such criticisms are made without sufficient analysis or investigation to show the kind and necessity of charges making the overhead total and without realizing that so much depends on the system of accounting—that is, on what is required to be charged to overhead.

As an illustration of how the overhead may be affected by a change in accounting methods, the following actual example is cited:

For July, 1922, the expenses in the machine shop, Shop 31, Navy Yard, Norfolk, were as follows:

Supervision	$ 1,958.93
Miscellaneous labor and supplies	1,310.71
Office, shop store, etc.	797.04
Damage and waste	6.55

Scrap credits	291.03 (credit)
Instruction of employees	210.36
Leave	4,378.82
Holiday	1,089.22
Repairs, replacements and additions to equipment, portable power tools, loose and hand tools and repairs to plant appliances and machinery and machine tools	2,294.40
Power transfer	751.79
General expense transfer	1,794.14
Total	$14,300.93
Productive labor	$11,397.83
Actual indeterminate rate	125 per cent

In accordance with accounting instructions supervision is included in the above. In probably eighty per cent of the cases, however, supervision could be charged direct to a specific job and thus classed as productive labor,—if the approved instructions would permit.

In the above example this would amount to approximately $1,667.00. That is the productive labor would be increased by $1,667.00 and the total shop expense would be decreased by the same amount. The result then would be:

Shop Expense	*Productive Labor*
$14,300.93	$11,397.83
1,667.00	1,667.00
$12,633.93	$13,064.83

Resulting indirect = 96.7 per cent.

Similarly if we correct our example so that the productive labor includes leave and holiday pay—and in reality the *actual* pay is the so-called daily pay plus an amount equal to the leave and holiday pay earned—instead of charging it to the expense account as required by accounting instructions, we must add 37/223 = 16.6 per cent of a day's pay which will be paid later as leave and holiday.

Considering the total pay earned, therefore, as productive labor, the result in the above example is:

Productive labor	$16,709.00
Shop expense	8,988.00
Shop rate	54 per cent

This is a large reduction from 125 per cent. The same expenditures are involved. The difference in shop rates is due entirely to assumed differences in methods of accounting and the assumptions made are not unreasonable. In fact these two changes reduce this particular shop indeterminate to a figure more nearly comparable with the corresponding figure for a private yard as the latter has no leave and holiday, and charges most of its supervision direct to the job.

There are two comments or criticisms frequently made from official sources which are discouraging to officers on duty in a Navy Yard. One of these comments is that a certain order perhaps from another Bureau of the Navy cannot be placed in the Navy Yard as the money available is not sufficient to stand the exorbitant overhead rate in the yard. A reply to that comment is attempted in what is written above. The other comment is that an order cannot be placed with the yard because although the yard submits the lowest estimate of cost, the amount submitted is only an estimate and is not accompanied by a guarantee that the estimated cost will not be exceeded. The result thus is that the cost of the estimate already made and charged to indeterminate goes to increase further the shop indeterminate and the hoped for reduction due to an increase in productive labor is not realized.

Of course the yard estimate cannot be a guarantee as the final charges must be the actual cost; but the estimates actually are close—few are very much in error—and the estimates would be even consistently closer with a more dependable uniform supply of work which would stabilize the conditions in the yard which affect the costs. Also, the yard would perform all the extras which developed during the progress of the work for actual cost and everyone who places contracts with private yards knows he must pay a profit on extras and usually in a large contract there are many extras.

If all the branches of the Navy Department and all the other departments of the Government understood the conditions there should not be great difficulty in persuading them to participate in the benefits of an efficient Navy Yard.

The efficiency of the Navy Yards is properly a concern of the private citizen, and it is a matter about which he should know more,—certainly one about which he should not be given the wrong impression which comes from hearing or reading criticisms from persons not sufficiently informed or in touch with the subject.

The officers on duty in a Navy Yard take just as much pride in an efficient organization and work just as hard for such a result, as the officials in an outside plant. That the officers are capable of producing and maintaining efficiency should not be open to serious question by anyone who is acquainted with the personnel of the large shipyards in the country, and who thus knows the high officials in those companies who have come from this same set of officers as those who are stationed in the Navy Yards. There is no reference to corps. The officers in a Navy Yard today are from all corps in the service, and the officers who have left the service from time to time and have gone into private shipbuilding plants, and also with other corporations, in which they have risen to high positions, are similarly from all the corps in the service.

Criticisms of the cost of work in Navy Yards are usually based on incomplete information or on a perfunctory acceptance of the conditions which are imposed on the Navy Yards by law, and which cause a superficial examination to indicate comparative inefficiency which would not be indicated by a knowledge and study of all the facts.

Many of the estimates submitted, and also the returned costs of completed work, would be accepted as reasonable, or even considered to be low, if furnished only as lump sum totals. The amounts would be considered reasonable and satisfactory for the work involved. When furnished, however, as so much direct labor and so much indirect, the attention is at once focussed on the amount set down as the indirect which for some reason is considered by many as being an amount required to be paid for which no return is received; hence the criticism. Objection is

made when such an estimate is furnished that the allotment, or the special deposit, or whatever the funds may be, should not have to bear the burden of the indirect. The non-productive (industrially) activities of the Navy Department for which the Navy Yards occasionally do work object to being charged with the indirect expense and, instead, either request the transfer of the workmen necessary for a particular job in order that their appropriation will be charged with the wages of such employees (direct labor) only, or request the loan of such appliances as are necessary that they may perform the work with their own employees. In the first case the yard loses the productive labor. In the second case the yard later charges against its overhead whatever repairs are necessary to restore the appliances to satisfactory condition—and usually repairs are necessary, after such use.

The loss to the yard in any one of these instances is small. The real loss is much more serious and is to the service generally. The organization with all the facilities of a Navy Yard should be for the benefit of all branches of the Navy Department and should be available always for any work required. Everyone in the service should realize that the service is doing the best it can to run the yards efficiently and that the cost of work turned out by the yards is low for the kind of work done and under the conditions which exist and have to be accepted. The yards know better than can any other establishment, what is wanted and how it should be done. The officers in the yard and those in other branches of the service all talk the same language. All those outside the yards, in whatever branch of the service, should appreciate the function of the yard, and recognize the principle that all branches of the service, all naval appropriations, should pay their portion for the maintenance of the organization, for the upkeep of all the plant facilities necessary to a thoroughly efficient up to date yard. That is necessary if the yards are to fulfill the functions for which created. There would appear to be no reason why the appropriations under the Bureau of Engineering are more obligated to maintain their share of the efficiency of the Navy Yards than are those under the Bureau of Medicine and Surgery; any more reason for the appropriations under the Bureau of Construction and Repair bearing their share of such

expense than the appropriations under the Marine Corps. The yards are for all alike; but if Navy work—and there is not much work pertaining to the different branches of the service which is not Navy work—is not all done in the Navy Yards regardless of the appropriation under which it falls, then the yards and the Navy suffer in efficiency accordingly.

This article has been suggested by the frequent criticisms of the excessive cost of work in Navy Yards; and also, more recently, of the method adopted of obtaining competitive bids from the different yards before assigning work. There is a wide difference between competitive bids from private yards and competitive estimates from Navy Yards. The most essential step now in connection with the latter is to effect uniformity in the Navy Yards in the distribution of the overhead expense.

STARTING A SHIP'S LIBRARY IN THE COAST GUARD

By Captain Byron L. Reed, U. S. C. G.

THERE appears to be renewed interest in obtaining books and reading matter for men on Government and merchant vessels and appeals for contributions of books for libraries on ships have lately received wide publicity. In these days of plentiful books of all kinds generous responses from societies and individuals may be expected, and all on shipboard who are fond of books will find contentment and pleasure in their perusal. The delights of communion in private with favorite authors is well set forth in Conan Doyle's *Through the Magic Door*.

The revived interest in books for ships recalls an incident in my own experience, nearly thirty-eight years ago, in starting a library for enlisted men on a revenue cutter.

In March, 1886, while attached to the revenue cutter *Gallatin* with headquarters at Boston, Mass., and cruising district along the New England Coast, we rendered assistance to the fish commission steamer *Fish Hawk*, then under naval command, in the harbor of Portsmouth, N. H., off Kittery foreside.

A heavy northwester blew for several days causing much drifting of vessels in the harbor and in the mix-up two fishing schooners were swept by wind and tide alongside the *Fish Hawk*, one on each side, making her situation both disagreeable and dangerous. In this emergency, appeal was made to the *Gallatin* for assistance which was rendered with difficulty, using a ten-inch cable-laid hawser furnished by the *Fish Hawk*. One schooner was towed clear successfully but during the operation the swift current sheered the cutter upon another vessel at anchor, endangering both vessels, so the hawser was cast off while the schooner in tow also let go of it as soon as a berth for anchoring was reached. However, the *Fish Hawk* was freed and proceeded to the Portsmouth navy yard.

Next day, the gale having moderated, the *Gallatin* proceeded to Boston. When off Cape Ann we discovered that a long scope of hawser was trailing astern from our propeller, but as half the distance had already been covered in safety the cutter held her course and later in the day made fast to an East Boston wharf where the hawser was cut adrift. I, as the youngster, was sent to deliver it to the commandant of the Boston navy yard, Captain Joseph Fyffe. Meeting this well known officer was a pleasure and his personality even yet is impressed upon my memory vividly, due especially to a statement made with marked emphasis to someone who came into the office with a message from Washington that he "was a captain in the United States Navy whose business it was to command frigates and not to chase commas all over the page," and that he had told that to the Secretary.

So much is preliminary to the story of forming a library association on the *Gallatin*.

The remnant of the *Fish Hawk* hawser wound round the propeller was clearly manavelins, which the first lieutenant sold to a junk man for three dollars and a half and turned the money over to me to buy books for the berth deck.

The *Gallatin* had a crew of about thirty men all told, a few of whom cared for books. It was my object to get as many as possible interested in a library. The junk fund was augmented by small contributions from aft, so the enterprise was launched with a few dollars to begin with. We held a meeting on the berth deck and I gave a book talk, then the men were asked to name the books they wanted. Immediately numerous suggestions were offered but as the fund was too small to accommodate everybody an auction was held, that is, the privilege of first choice was sold to the highest bidder, then second choice and so on down the line. The books named by highest bidders under this scheme were purchased first and when they came on board were immediately loaned for a limited time.

By this method the library funds were augmented in small amounts ranging from twenty-five cents for first choice to ten and five cents for second and third reading privileges. Of course suitable books not acquired by competition were bought in the course of time when possible to encourage the men in the thought that the library belonged to the ship and was meant for all hands.

Sometimes a man would want to own a particular book, in which case it was sold, after it had served its purpose, at a fair price or a competitive price and the proceeds were added to the fund.

I was detached from the *Gallatin* about three months later but during the period the interest was kept up and a small and creditable collection of books acquired. I am sure the welfare and contentment of the crew were improved for the time being.

To succeed along the lines above described the leader must know something about books in general and have a liking for them sufficient to take a personal and discriminating interest in their selection so that the viewpoint of the men may be appreciated and their desires met. On their part the men will respond with an interest that will be beneficial to the ship as a whole and to each individual who finds pleasure in the literary output of master minds.

DISCUSSION

Taking the Navy to the People

(See page 2010, December, 1923 PROCEEDINGS)

CYRIL MORAN—"People are willing to believe what they read and when they can only read the false they cannot be expected to have ideas that are based on the truth."

Bringing the Navy to the people, as suggested and outlined in the PROCEEDINGS article from which the above is quoted, presents problems ramified and somewhat in excess of those touched upon.

One of these is education to accuracy, and the supervision if necessary, of the channels through which the Navy reaches the public. An oversight along these lines, earnestly read and assimilated, possibly, by hundreds of thousands of Americans in December, is herewith submitted for the attention and consideration of the service:

In the Sunday magazine section of the *Detroit Times*, there appeared on December 9, 1923, a full page story, delineating in picture and statistic, the evolution represented in the three *Colorados*, the "whole story of American naval progress in sixty years." The article was prepared by the Hearst feature service and between December 2-16 appeared, I am informed, in New York, Chicago, Los Angeles, Milwaukee and wherever else the syndicate serves Hearst papers. Virtually all papers under that proprietorship utilize the identical feature and foreign articles, differing only in their display of local news items.

The story is a splendidly executed full-page advertisement for the Navy—and here is what we find in the "copy": "The first *Colorado* (steam frigate), of the Civil War period could have destroyed the combined navies of the United States and England, of the period of the War of 1812, without damage to herself." This statement is ascribed to Secretary of the Navy Denby.

The second *Colorado* (now the *Pueblo*) is desribed as a "member of the famous 'Great White Fleet'." It is the writer's impression, as a civilian and reader of advertisements, that the "Great White Fleet" is a line of banana boats operating between the Central American and North American ports. The "White Squadron" (or Fleet) antedated even the old *Iowa*, *Massachusetts* and *Indiana*, and embraced, I believe, such protected ships as the *Chicago*, *Buffalo*, *Newark* and *Baltimore*.

Regarding the recently commissioned battleship *Colorado*, the reader is informed through this article that she "is equipped with a major battery of eight 16-inch guns, each capable of hurling eight tons of explosives and

an article in this case should not be one of congratulations for the ballistic metal more than twenty miles with deadly accuracy. As a matter of fact, modern gunnery with enormous weapons has been worked out to a point that it is possible to drop an eight-ton projectile from one of the *Colorado's* guns on the head of a pin embedded in a block twenty miles away."

Now I ask you. Can you blame any American, living in Kansas say, (whose loyal enthusiasms are exceeded only by his credulity) from resting in perfect security behind such weapons and achievement as this? Don't laugh.

The article was written in good faith, probably by a newspaperman, after possibly visiting the new ship. Certainly it was not written until after some sort of an interview with officers or someone in an official capacity. The newspaperman saw a good story and he gave the Navy the best publicity of which he was capable. The result is not impressive. There must be a door at which the fault may be laid.

"The main thing," says Ensign Wharton, above quoted, "is to get the Navy side of the story to the American people through the newspapers and magazines." Just as main, in the writer's opinion, is for the Navy man to emphasize correct facts and figures to the reporter to whom he is giving the story. Newspapermen, as a rule, are not technically trained and so are not in a position to digest, and to accept or reject technical details in a specialized story. They must believe the man whom they are interviewing; he is the authority and on him the story returns. This latter applies particularly to the enlisted personnel, especially chiefs and petty officer ratings, who often think it great fun to take advantage of a landsman's ignorance of the service and "kid" a reporter when he comes over the side for a story.

When the opportunity presents (and one never knows how valuable it may be), get the proper facts and figures, and make sure your writing man thoroughly understands the subject before you let him out of your sight. Then the Navy's story can be told honestly, convincingly, and with no detraction of interest. Such palpable absurdities as the eight-ton projectile will not then creep into the story to cloy the interest and tax the imagination of an informed reader, or to mislead the uninformed.

Officers of the Navy have a grave responsibility in truthfully presenting its story to the people. A news-sense should be properly qualified by a sense of the necessities of the service, so that no chance will be overlooked in proclaiming them accurately and concisely.

The needs and problems of the Navy are just as good—better—news than its achievements, and will reap fruit in a closer understanding and sympathy on the part of the taxpayer for what the Navy needs and should have to protect him.

To illustrate my point:

Gun ranges have now increased to a point where observation from the firing ship is difficult if not impossible, and reliance for spotting in maximum battle ranges must now be placed in the airplane. The spirit of

superiority enjoyed by the Navy in the *Marylands*, but rather an inquiry and discussion as to whether the air service of the Navy is adequate to a point where this monster ordnance can be utilized at its maximum advantage. If it is not adequate you will agree, I think, that the information is news of the first importance.

Another instance might be:

Not that the *Colorado* is the most powerful warship, but how will the *Colorado* and her sisters, with a relatively low tactical squadron speed, prevail against a slightly less powerful but a faster enemy? And so on. Examples in the same vein might be multiplied endlessly.

Each technical advance brings its concomitant responsibilities, as each new invention begets novel auxiliaries and new problems in defense—all of which is news. Did Mahan, lately as that splendid mind devoted itself to the art of war, visualize such fantasies as diving fish perpended from battleships' bows, or 40,000-ton cruisers cleaving the sea at 35 knots, armed two-thirds with great blisters?

The essence of progress shall not be a satisfaction with things accomplished, but a constructive unrest toward improvement and perfection. The commanding position of the British Navy, the material completeness it has attained, and the tenor of the English press, with its favorable effect on the man who pays the bill, present an interesting study. The following titles, from British articles copied in the PROCEEDINGS in the past year, are indicative:

"Can the Empire be Made Safe?"

"Ministry of Defense Project not Found Practical."

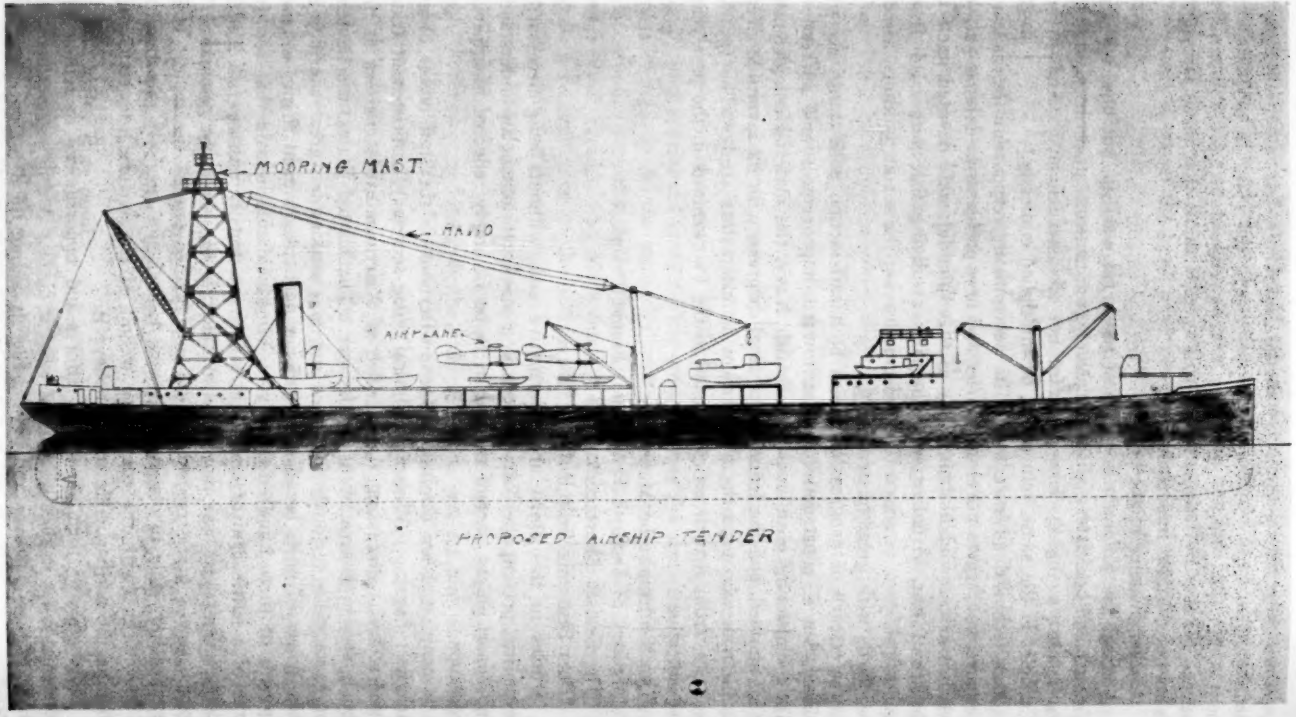
"The Cruiser Shortage."

"Does Britannia Still Rule the Waves?"

Articles in this spirit are informative and, without being necessarily pessimistic, present the Navy's needs in a manner to obtain an understanding support on the part of the public, to be favorably reflected in imperial legislation.

In contrast, I am reminded of one afternoon in the staff offices of an American flagship. With the admiral's flag-secretary, a lieutenant commander, I was discussing the sacrifice of American battle cruisers at the then-in-session Disarmament Conference. The United States, the lieutenant commander seriously informed me, was making no great sacrifice in these powerful units because we did not particularly need them; we had upwards of three hundred destroyers. In elucidation he said that for the price of a battle cruiser one could build, say, twenty destroyers. And a score of destroyers was more than a match, in the lieutenant commander's opinion, for a battle cruiser. I did not further pursue the topic. It is resumed here only to observe that such logic is not precisely the sort for a line officer (with the convincing weight of his uniform) to employ in amusing the civilian. He might believe it.

Let the Navy then, devote its efforts and opportunities to selling the people not what it already has, but what it needs. Aid newspapermen and publicists, yes, but over and beyond merely aiding them to "put over" the Navy's story, aid them—compel them—to get their facts straight.



PROPOSED AIRSHIP TENDER

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT COMMANDER H. B. HIRD, U. S. NAVY

AND

LIEUTENANT J. B. HEFFERNAN, U. S. NAVY

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GREAT BRITAIN

LOOKING FORWARD.—*The Naval and Military Record.*—From the naval point of view 1924 promises to be more eventful than the past year has been. If Parliament approves the shipbuilding program an early start will be made with the first batch of light cruisers designed for commerce protection. The building of these ships is long overdue, and the limited number of ocean-going cruisers we now possess is a serious source of weakness. The government, it is true, has no independent majority in the newly-elected House of Commons, but there is a growing conviction that, despite the disclaimers of party spokesmen, means will be found of ensuring the requisite support for legislation of obvious national urgency. We believe that the need for additional cruisers is well understood by responsible members of all parties. Moreover, politicians have learned by experience that a studied neglect of the Navy is a sure way to lose votes. If, therefore, the issue is placed squarely before Parliament, there is every prospect that it will do the right thing in respect of this program. The Singapore scheme, as we have previously pointed out, is on a different footing. It has been assailed both by Liberal and Labor leaders, and its rejection would now be certain were it not something more than a question of purely domestic policy. The plan for developing Singapore as a first-class fleet base signified a return to the old but sound conception of the British Navy as an institution for the defense of the Empire as a whole. During the years of the German menace there was a tendency to lose sight of our obligations to the daughter States and to look upon the

PROPOSED AIRSHIP TENDER

Navy as a force that existed, and had always existed, for no other purpose than to maintain command of the Narrow Seas. We fell into what has been aptly called this "North Sea habit of mind" early in the present century, but it is time we got out of it and accustomed ourselves to broader views of naval strategy.

That the present Board of Admiralty will remain in office throughout the year is in the highest degree unlikely. Earl Beatty has long been credited with a desire to enjoy that rest to which his years of strenuous service afloat and ashore have surely entitled him. Nothing but the strongest sense of duty can have persuaded him to undertake the onerous task which he has discharged since 1919. Had personal inclinations prevailed there is very little doubt that his active connection with the Navy would have ceased when he hauled down his flag in the *Queen Elizabeth* five years ago. He realized, however, that the Navy was in for one of those critical periods which always follow the conclusion of a great war. At such times there is a danger that our premier fighting service may suffer from the indifference engendered by the very completeness with which it has done its work. This danger was never more acute than at the close of the late struggle, for German sea-power had been absolutely annihilated, and to many it must have seemed as if a strong Navy would be, in the years to come, a superfluous luxury. Yet before this false idea had time to take root we had a sharp reminder that the frontiers of the Empire are not bounded by the North Sea. On the other side of the world events were taking place that could not be ignored. Two great Powers were contending, more or less openly, for the command of the Pacific, where the British Empire has territories and interests of great importance. With both of these rival Powers our relations were of the friendliest, but it was, nevertheless, out of the question that we should remain passive spectators of a contest on the outcome of which we ourselves had so much at stake.

Under the vigorous direction of Earl Beatty our post-war naval policy was speedily remodelled to meet the new circumstances. Although it was not publicly announced until October, 1921, the plan for creating a strong point *d'appui* at the gateway of the Pacific was tentatively submitted by the Admiralty before the end of 1919. A few months later they gave orders for the design of those giant battle cruisers—expressly intended for overseas operations—which were eventually authorized under the 1921 program, only to be canceled at a later date in deference to the decisions reached at the Washington Conference. These facts afford clear proof of the strategical foresight of the present First Sea Lord. Furthermore, it was at his prompting that the government decided to embark upon a policy of new construction mainly for the purpose of safeguarding the highways of Empire. The ships contemplated are but units of a future system of world-wide defense, of which the Singapore base forms an integral part; but it is, perhaps, too much to hope that Parliament will manifest as clear a vision of Imperial strategy as that which has been evidenced by the heads of the Admiralty during the past few years. It is, unfortunately, all too probable that political developments will shortly compel the resignation of Mr. Amery as First Lord. The position of his professional colleagues on the Board will be determined by the attitude of Parliament towards Singapore and the shipbuilding program. There is, however, reason to believe that Earl Beatty is in any case desirous of laying down his office as soon as may be. Several distinguished officers have already been named in the press as candidates for the succession, but it is certain that no appointment will be made until the political situation clarifies. A Labor Government might have its own views on naval policy and endeavor to select a sea officer who would be

amenable to its commands, however opposed these might be to the interests and the sentiment of the service.

THE NEXT WAR.—*Army, Navy and Air Force Gazette*, 22 December, 1923.—The United States is already preparing for the next war. This is evident from the first message to Congress of the new President. Mr. Calvin Coolidge gave one cardinal principle for America to maintain. "We attend to our own affairs, our own strength, and protect the interest of our own citizens," he said. Both the Army and Navy are to be strengthened. Additional planes are needed for the Army and additional submarines for the Navy. The defenses of Panama are to be perfected." Affirming that weakness invites imposition, he declared that "a people who neglect their national defense are putting in jeopardy their national honor." The annual reports of the chiefs of the Army and Navy Departments further indicate that in America it is fully realized that the view of the late struggle being a "war to end war" is chimerical.

Of more significance in this connection is the publication in France of a brochure by an air officer entitled "The War of 1924" which is said to be selling by thousands in France, and in which the revenge of Germany is pictured. Despite the reduction of her armaments by the Versailles Treaty, Germany has built for her aircraft in Russia, with which, after the restoration of the monarchy, she bombards Paris in a war of retaliation. Pamphlets of this description, like Chesney's "Battle of Dorking," "The Great Naval War of 1887," and others, are issued to warn the public against the folly of neglected defenses and to prepare the people for military expenditure made necessary by new developments of war. Their portent should neither be missed nor under-estimated.

What is the position in our own country? The need for keeping the public mind alert on these matters was never greater. It has been said that if certain changes take place in the government, we may expect to find that the battleships now under construction will be stopped, that the light cruisers needed in replacement will not be begun, that the essential base of supply which has been planned at Singapore will not be proceeded with, and that even the valuable Empire cruise will be curtailed. Overhanging all these is the uncertainty and suspense caused by the unsatisfactory position of the aerial arm of the Fleet and the threatened cuts in the pay of officers and men. There is a good deal said about the alleged threat to peace involved by the occupation of the Ruhr, but it must be remembered that we also hold at present nearly all the German colonies, which they cannot but desire to recover some day. The situation as a whole is one of grave uncertainty, and requires continual watching by all with patriotic instincts who have the welfare—which means the security—of the nation and Empire at heart.

NAVAL CONSTRUCTION.—*Naval and Military Record*, 26 December, 1923.—As our two new battleships, the *Nelson* and *Rodney*, have already been on the stocks for twelve months, they will, presumably, be launched some time in the coming year. If that event does not take place before next August, six years will have elapsed since a capital ship for the British Navy glided down the ways. This was the battle cruiser *Hood*, which entered the water at Clydebank on August 22, 1918. The last British battleship to go afloat was the *Ramillies*, on September 12, 1916. Meanwhile, the *Rodney* and *Nelson* are building in complete secrecy, as though it were of the first importance to keep their details hidden. We have already recorded our opinion of this policy, and have also drawn attention to comments which appear in the new issue of *Brassey*.

When the battleship discussion was raging in the spring of 1921, Sir

J. H. Biles, in a letter to *The Times*, pointed out the injurious effect which official secrecy might have on future warship development. The German menace, followed by war, gave the powers that be an excuse for making a mystery of all new construction. "That excuse," said Sir J. H. Biles, writing in May, 1921, "has ceased to have value, and it is desirable to remind the authorities that a policy of secrecy adopted deliberately to avoid criticism is likely to be harmful to the country, as well as to those who practice it."

Evidently this reminder had no effect, for the plans of the four super-*Hoods* were never disclosed. Since Sir J. H. Biles wrote the last pretext for reticence has been removed by the Washington Treaty, which has absolutely stopped the competitive building of battleships. This notwithstanding, the public has been refused even the barest information concerning the *Nelson* and *Rodney*. It is all very strange and inexplicable.

According to some unofficial notes in *Brassey*, the ships are 680 feet long and 106 feet in beam, which would make them 100 feet longer and three and one-half feet broader than the *Royal Sovereigns*. The same authority assumes them to carry nine 16-inch guns in three triple turrets, and suggests that the anti-torpedo bulge "will be fitted, as it were, inside instead of outside the hulls." This latter piece of information is of particular interest, for the position of the bulge in new ships formed the subject of dispute between the experts two or three years ago. Sir E. d'Eyncourt, as Director of Naval Construction, was in favor of retaining the outside bulge, as fitted to the *Hood* and many other ships. Sir Philip Watts, on the other hand, contended that it was better to design the ship without anything in the nature of a bulge, to accept the beam involved in the fitting of a bulge, but to carry that beam upwards in a more or less vertical line in an ordinary ship-shape form. This was the view also taken by Sir J. H. Biles and Sir Westcott Abell, of Lloyd's Register.

If *Brassey* is rightly informed the ideas of Sir Philip Watts in this respect seem to have been embodied, though in a modified form, in the *Nelson* and her sister ship. The pros and cons of this question are, of course, highly technical. What really matters is that these and other modern capital ships of our Fleet are of enormous beam compared with the older vessels, and should, therefore, be far better able to resist underwater explosions. It is melancholy to reflect that in pre-war days the dimensions of our battleships were governed in great measure by the size of existing docks. Owing to this restriction they were deficient in sub-surface defense. It is more than doubtful whether the large-caliber air bombs which sank the *Ostfriesland* would be able to destroy the flotation of any post-war battleship.

BRITISH "L-24" RAMMED BY DREADNAUGHT IN CHANNEL MANEUVERS.—*Baltimore Sun*, 11 January, 1924.—Weymouth, England, January 10.—The British submarine *L-24* was sent to the bottom of the sea today by the dreadnaught *Resolution*, with which she was in collision. The disaster, which occurred off Portland, was similar to one which happened two years ago, when the *K-5* was sunk.

So far as is known all on board the *L-24*, numbering forty-three perished.

Details are somewhat meager, but it seems that the Atlantic fleet was leaving Weymouth in various groups, including several submarines, for the spring cruise, when the *Resolution*, belonging to the *Royal Sovereign* class, rammed the *L-24*, which was a minelaying vessel and had fourteen live mines aboard. The accident occurred in a fog, when the vessels had opened out in the channel.

Another report says that the collision occurred when a combined attack on the fleet was being carried out by submarines from Portland, Ports-

mouth and Plymouth. The *L-24* sank immediately, and, although salvage vessels hurried to the spot and the whole area was searched by the mine-sweeping flotilla, no trace of the ill-fated vessel was found.

There is a bare possibility, naval men say, that there may be some survivors; that is, if the submarine can be brought to the surface. Depending upon how the vessel was struck, the crew may have been able to close the watertight compartments, in which case they might survive for forty-eight hours.

After the disaster the *Resolution* returned to Portland Harbor, where she will be examined by divers at daybreak. A court of inquiry will be held aboard the *Resolution* tomorrow, when also salvage efforts, interrupted by darkness today, will be resumed.

This was not the only accident, for the submarines *K-2* and *K-12* also collided near the same place, both being slightly damaged.

The admiralty has issued a list of the names of those aboard the *L-24*, which unfortunately carried a much larger crew than customary, extra men being aboard for training purposes. The King has telegraphed a message of condolence and sympathy for the relatives of the crew.

The *L-24* was one of the largest type of submersibles, being built under the war program and completed in 1919. She was 238 feet six inches in length over all and displaced 870 tons on the surface and 1,070 tons submerged. She was equipped as a mine-layer and carried no guns, but had four torpedo tubes and fourteen mine tubes.

FATE OE SHIPBUILDING PROGRAM.—*Naval and Military Record*, 26 December, 1923.—Probably the final task undertaken by Sir E. T. d'Eyncourt before he resigned the post of Director of Naval Construction was to get out plans for the new "County" cruisers. This labor is not likely to be wasted, for inquiries instituted among the rank and file of all three parties represented in the new House of Commons lend no color whatever to rumors that the shipbuilding program fathered by the Baldwin Cabinet is to be dropped.

As we have previously pointed out, there is, on the contrary, a strong impression in well-informed circles that the House of Commons will approve, by a sufficient majority, the laying down of new cruisers in the coming year. The number may not be as large as was hoped for; in fact, it is virtually certain that not more than six ships will be sanctioned in the first instance. Of this number two, at least, will be ordered on the Clyde, leaving only four to be divided among other private firms and the dockyards.

It has further developed from these inquiries that the extremists who want to abolish all armaments form but a negligible minority in the ranks of Labor. The leaders of that party repudiated the brand of pacifism which would leave this country defenseless in a ring of potential enemies. They are prepared to stand out for an adequate Navy, and still more for a strong and efficient Air Force. The real bone of contention is likely to be found in Singapore. Premature rumors of the abandonment of this scheme have been officially denied, but there is, unfortunately, very little doubt as to what would be the result of a division in the new House of Commons on this issue.

But Singapore is primarily an Imperial undertaking. If Parliament declines to go on with it the Dominions will have just cause for resentment, and possibilities of friction between the mother country and her daughter States may arise. So much is clear from the guarded but significant words of Mr. Massey's valedictory address. Mr. Bruce, the Australian Premier, has also let it be known that his people attach the utmost importance to the completion of the Singapore works. In these

circumstances airy talk about scrapping the project is strongly to be deprecated.

The financial burden it would impose on this country has been wantonly exaggerated. The whole scheme is not estimated to cost more than £9,500,000; the expenditure is to be spread over nearly ten years, and part of it will be defrayed by the Dominions. It would truly be the negation of statesmanship to affront our kinsmen overseas by repudiating a project that would cost us £900,000 a year at the most. We claim to be an Imperial people, yet many of us look askance at the Singapore plan simply because it concerns a base that is 10,000 miles away. Yet a great part of our food supply comes from places still more remote, and if that traffic were interrupted because of inadequate naval protection the effect would speedily be felt in every English home. To turn down the Singapore scheme would be to stultify our entire naval policy, for it would obviously be foolish to build new battleships if we mean to deny them the power of cruising and fighting in any but home waters.

SINGAPORE BASE TO GUARD THE BRITISH RUBBER MONOPOLY.—*Boston Transcript*, 26 December, 1923.—Shanghai, November 10.—Another interesting explanation of the Singapore British naval project is given here in Shanghai. It does not point to such a friendly attitude toward the United States as the one advertised in England. It is pointed out that England has colossal rubber interests in the region about the Singapore base; that is, in the Straits and the nearby islands, from which practically America's entire takings of rubber come. The United States is completely dependent upon the plantations of this region for its rubber supply, and by the control of these England is able to wield a very powerful trade weapon over the United States.

That she has not hesitated to take advantage of her opportunity is borne out by developments in the rubber trade of the last two years. After the war, during the trade slump which hit the entire world in the latter part of 1920, the rubber plantations of Java and Borneo found themselves stranded in the crisis. Rubber shares dropped to practically nothing. In view of the crisis, an outlet was sought from the straitened circumstances of the rubber planters, and found in a restriction of production which was legalized by the passage of the Rubber Restriction Act by the British Government, automatically cutting off a certain per cent of the rubber production and putting rigid limits on the output of rubber.

As a result of this the rubber plantations jumped from depression to prosperity. But at the same time American buyers of rubber were made to feel the pinch in a remarkable manner. It has been estimated that at the present time the United States is paying England for her control of the rubber production, an extra $500,000,000 per year for the rubber necessary for her industry. Since England controls a practical monopoly of the rubber output of the world, and the United States has no alternative supplies, she is practically at the mercy of England. The Rubber Restriction Act clinched England's hold. A government controlled monopoly for which America pays the bill is the result.

Already America has investigating committees on the search for possible other sources of rubber. But it takes eight years for a rubber plantation to produce. Before America has developed an American-controlled rubber supply she will have paid to England a tribute of ten billions of dollars, or the equivalent of the European debt to America just after the peace, for England's monopoly.

Friction has already developed occasionally. But England, it is argued, is making sure of her monopoly by protecting it with a naval base.

OUTLOOK AT WHITEHALL.—*Naval and Military Record*, 19 December, 1923.—It is all but certain that the Board of Admiralty will undergo reconstruction in the near future. While the Prime Minister's decision to carry on, at any rate until the assembly of Parliament, has postponed for the time being the formation of a new government, it is difficult to see how the present administration can hold its own for long, bereft as it is of an independent majority. Mr. Amery's departure from Whitehall would seem, therefore, to be only a question of weeks. In view of the fact that not for many years has a First Lord worked in such close harmony with his professional advisers, there is more than a chance of his resignation being followed, sooner or later, but that of the First Sea Lord and other naval members of the Board. The appointment of a new Board will almost certainly be necessary if Parliament rejects the main features of the policy adopted by the present Admiralty régime. Earl Beatty and his colleagues are too deeply committeed both to the Singapore scheme and the cruiser program to acquiesce in the rejection of either.

An early opportunity will no doubt be found for testing the attitude of the new Parliament towards those measures and naval policy in general, for it will soon be necessary to draft the Navy estimates for the coming financial year. Inquiries made in well-informed quarters indicate no likelihood of the government's bringing in a supplementary estimate for the first batch of new cruisers, as was the original intention. In that case, of course, there can be no question of ordering the ships early in the New Year, as Mr. Baldwin hoped to do. Until the political situation clarifies it would be futile to indulge in speculation as to the personnel of the next Board of Admiralty. All that can be predicted with assurance is that any cabinet which resolved to cut down naval expenditures without regard to the adequacy or efficiency of the service would have some difficulty in finding naval officers willing to serve under it at Whitehall.

Beyond the fact that work on both vessels was seriously delayed by the boilermakers' dispute, now happily ended, there has been no news of the two new battleships, *Nelson* and *Rodney*, which were laid down nearly twelve months ago. As much mystery is made about them as ever surrounded the construction of our most novel types in pre-war days, when there were reasons for maintaining reticence. Having more than once protested against this purposeless "hush" policy, we are glad to find our view supported by Commander C. N. Robinson, R.N., in his article on British naval progress in the new issue of *Brassey*.

There is, he finds, no longer that need for close secrecy regarding the details of new ships which prevailed during the years before the war. "It may be hoped," he adds, "that the authorities will recognize this and abandon the policy of concealment which marked the building of the dreadnaught fleet. Then secrecy was desirable in order to baffle the Germans, and was justified by its success, as witness the design of the *Blücher* in comparison with that of the *Invincibles*. Now, however, there is no such competitive building, for the British capital ships are the only ones under construction in any country, and none can be laid down for ten or more years, and definite limits in regard to the important elements of displacement tonnage and the caliber of the heavy armaments are fixed by the Washington Treaty." There is, in fact, no imaginable reason why details of the new battleships should not be disclosed, and we therefore echo the hope expressed by Commander Robinson that the Admiralty will publish them without further delay. In the present circumstances concealment, besides being irritating to the public, is liable to cause misunderstanding and suspicion abroad.

Though the Germans were certainly deceived in the case of the *Invincibles* and thereby led into building the *Blücher*, a ship of inferior power, it is still a question whether the policy of secrecy initiated by Lord Fisher

was justified by the results as a whole. Until that time Germany, as well as this country, had always published the salient details of her new construction well in advance, but as soon as we set up a censorship she naturally did the same, and did it much more effectually. In our case there was a constant leakage of information into the press concerning the broad details of all new ships, but from 1906 to the outbreak of war the world was allowed to know nothing definite about any new German warship until she was actually in commission, and not too much even then. In the end, therefore, we were beaten at our own game.

It seems not improbable that our information about the German fleet would have been much more complete and accurate when the war began if we had never made any attempt to conceal our own designs. It is worth recalling in this connection that the United States naval authorities have invariably published all relevant facts about their new ships before the keels were laid, as also have France and Italy. France, for example, has made no attempt to withhold details of her latest cruisers, destroyers, or even submarines. The only other government besides our own that makes a mystery of such matters is that of Japan. It has been said that "bureaucratic secrecy is usually a cloak for inefficiency," though there is, fortunately, no reason to suppose that this dictum holds true in the case of British naval construction.

British Labor Likely to Modify its Program.—By H. C. Bywater, *Baltimore Sun*, 21 January, 1924.—London, January 2.—A big note of interrogation would represent the simplest and safest form of comment on the present political situation in this country. Literally, no one, not even the chiefs of the respective parties, can foresee developments even a week ahead.

In spite of vehement disclaimers from Mr. Asquith and Mr. Ramsey MacDonald, and the rather less emphatic assurances from the Conservative side, a belief persists that some sort of interparty co-operation will be arranged in the near future, for without a compromise of this nature it is difficult to see how the King's Government can be carried on.

But, while the attention of most people is centered for the moment on the drama of domestic politics, others await with some trepidation the possible effects of its reaction on the situation abroad. There never was a period when Britain stood in greater need of a strong and stable government; yet this she has not got, nor is she likely to get it for some considerable time.

The Baldwin Cabinet's attitude toward European affairs was one of watchful waiting. It had, on the whole, a pro-French bias just sufficient to counteract the opposing tendency of its Foreign Secretary, Marquis Curzon. To this cleavage of opinion within the cabinet may be attributed the absence of any definite line of policy in regard to reparations, the Ruhr and other grave issues which have held the field during the year just closed.

The Prime Minister himself does not appear to have been intensely interested in foreign affairs, or at any rate to have held strong convictions on any particular aspect of them. His critics label him an opportunist, which is only another way of saying that he is a politician rather than a statesman. Be that as it may, when he goes out of office—in a fortnight or three weeks hence, according to the prophets—he will leave the foreign affairs of his country in much the same posture as the first Conservative Government found them more than a twelvemonth since.

In the interval, it is true, France has occupied the Ruhr and dug herself in there so firmly that it is not easy to see how she can be dislodged. But even this development led to no perceptible modification of British

policy, for the government, after declaring the Ruhr occupation to be illegal, retracted this assertion—by implication, if not in so many words—when it published last September the famous communiqué which laid stress on the harmonious relations prevailing between Paris and London.

France, therefore, has had little cause to complain of British interference since the Conservatives came into power. On this account the latter have been attacked by Liberal and Labor critics, and by none more severely than Mr. Lloyd George, who still maintains that the French would never have entered the Ruhr had he remained in office—a statement unsupported by a shred of evidence. Mr. Asquith has told us, in his own sonorous phrases, that he would have made a far better job of foreign affairs had they been left in his hands, but, wisely perhaps, he does not condescend to details.

Labor spokesmen, too, have had a great deal to say about the blunders of the Conservative régime in the domain of external policy, and, less cautious than Messrs. Asquith and George, they proceed to explain not only what they would have done, but what they propose to do as soon as a Labor Cabinet meets at No. 10 Downing street.

Briefly, their panacea for the ills which afflict Europe is "a conference of all the interested parties, including Germany and Russia." This conference is to settle the reparations problem out of hand. Should France prove recalcitrant she must be brought to heel by "moral pressure." Her withdrawal from the Ruhr is assumed to follow as a matter of course at the word of command uttered by the other "interested parties."

With reparations and the Ruhr both out of the way, the conference will proceed to erect impregnable barriers against future wars. This is to be done mainly by bringing Germany and Russia into the League of Nations, and so reinforcing the moral pressure which that body is able to exert. Thereafter all is to be peace and amity, and the millennium will have dawned at last.

There are earnest men in the ranks of Labor who sincerely believe themselves capable of achieving these beneficent results once they are vested with governmental powers. Well, it looks as if they are about to have an opportunity of putting their theories to the test. One would feel more hopeful, however, if they evinced a clearer perception of realities, and were less prone to mistake what ought to be for what is.

Stripped of their fine phrases their policy stands revealed as one of coercing France, possibly in the interests of Europe as a whole, but certainly and primarily in the interests of Germany and Russia. Our Labor champions have only themselves to blame if their assurances of wishing to grant fair play to France are perceived with skepticism.

Their marked tenderness for Germany is not of such recent growth as to be explicable solely on the ground of commiseration for the under dog. It dates from a time much farther back than either the invasion of the Ruhr or the conclusion of the Treaty of Versailles. Some of the Labor stalwarts now foremost in urging us to support Germany against France—if need be, as Mr. Norman Angell recently hinted, by force of arms—made themselves notorious during the World War by their unconcealed sympathy for the German cause. In their eyes France was as much the enemy then as she is today.

It is passing strange that Germany, the cradle of militarism, should possess such an irresistible fascination for the British Socialist, while France, the cradle of democracy, arouses in his mind none but sentiments of aversion. Can it be that he sees in Germany, as the birthplace of Karl Marx, his spiritual fatherland?

Whatever the explanation, we may take it for granted that a Labor Government will approach foreign affairs with a strong prejudice in favor

of Germany and against France. But prejudice alone offers no sound basis on which to construct a foreign policy. The interest of Great Britain lies in the maintenance of peace, and that interest will assuredly not be served by making an enemy of France.

Whatever the Labor leaders may say or think, the mass of the British people would tolerate no policy which aimed at restoring to Germany all her former economic and military strength at the cost of an open breach between France and this country.

Russia is another issue in regard to which the controllers of the Labor party are out of touch with popular opinion. They have placed the resumption of normal relations with that country at the head of their program, and the bulk of the nation does not seriously object to this, though it has enough common sense to discount very heavily the Labor prediction that by recognizing Lenine and Trotzky as the rulers of Russia, *de jure* as well as *de facto*, we shall at once give a tremendous boost to our foreign trade and demobilize half the army of unemployed.

But Bolshevism as a political creed is utterly loathsome to the British people, and the sooner that plain fact is realized by the accredited spokesmen of Labor the better it will be for their party.

If the past pronouncements of these men afforded a certain indication of the foreign policy they mean to pursue when Labor is called to take the helm of government, no words could do justice to the gravity of the outlook. To put it mildly, we could look forward to serious trouble with France at an early date, to estranging the United States (which would inevitably and wisely turn the cold shoulder to a British Government apparently bent on rushing headlong into war), and to seeing the constitution recast on communistic principles.

Probably, however, these disasters are more remote than some timorous folk believe them to be. On nine politicians out of ten the assumption of ministerial office has a sobering influence, and those who know Mr. Ramsey MacDonald best are convinced that he will not be the tenth.

But it remains to be seen whether he is strong enough to hold the reins once he has grasped them by keeping in check the wild men who have donned the respectable cloak of Labor to conceal the livery of Moscow.

FRANCE

French Naval Program.—*The Engineer*, 14 December, 1923.—When France took stock of her naval defenses after the war, she found that a very large proportion of the vessels were out of date, and that the remainder were no longer suitable for the changed conditions of naval warfare. A new naval program was, therefore, drafted, in which light and fast cruisers, submarines and aircraft occupied a prominent part, not only for the reason that they appeared to fulfill the special conditions of French naval policy but because they were supposed to give the best return for the necessarily limited expenditure permitted by the country's financial situation. The first part of this naval construction program was begun last year, when work was started upon three cruisers of 8,000 tons, which are expected to rank amongst the fastest in the world, six destroyers, twelve torpedo-boats and six small submarines, while the battleship *Béarn* was to be transformed into a seaplane carrier. The work on all these vessels is now well advanced. The second part of the program, involving an expenditure of 2,356 million francs, will soon come up for debate in the Chamber of Deputies. It provides for the construction of six light cruisers of 10,000 tons, fifteen destroyers of 2,400 tons, twenty-four torpedo-boats of 1,450 tons, four submarine cruisers of 3,000 tons, thirty first-class submarines of 1,300 tons, two mine-layers of 4,000 tons, and four oil tank steamers of 10,000 tons. A large part of the work is to be carried out in

private shipyards. The building of the vessels already under construction has been accelerated in a way that proves the efficiency of the yards entrusted with the work.

FRENCH BUILDING POLICY: 113 NEW WARSHIPS: MASTERY OF THE MEDITERRANEAN: JAPANESE SUBMARINES.—By Hector C. Bywater, *Naval and Military Record*, 2 January, 1924.—No appreciable change in the international naval situation took place during the past twelve months, nor is there any indication of coming developments of a nature likely to disturb the equilibrium of sea power. Many new programs are under consideration, but even though all these schemes were carried into effect, the balance of strength would not be modified to any marked degree. The new ships projected in this country are sufficient, but no more than sufficient, to maintain our lead in cruisers. If seventeen are built, they will bring the establishment of ocean-going cruisers up to twenty-three. The United States will eventually have eighteen such vessels if the new program goes through, and Japan eight. The term "ocean-going" is applied in this instance to ships of 7,000 tons and over. But if a vessel of 5,500 tons is regarded as fit for ocean service, the Japanese Navy makes a more formidable showing, for it includes twenty-four cruisers of this and greater displacement built, building, or on order.

The influence of the Washington Treaty on light construction is becoming very pronounced. Previous to that compact the largest cruisers building did not exceed 9,750 tons, and the majority were between 5,000 and 8,000 tons. Now, however, all the new ships contemplated in this country, the United States, Japan, and Italy, appear to be designed for a "standard displacement" of 10,000 tons, which means that with a full load of oil and stores they will be verging on 12,000 tons. Seventeen ships of this type are projected in Great Britain, eight in the United States, four in Japan, six in France, and two in Italy—making a total of thirty-seven. To Japan will belong the distinction of laying down the first cruiser designed in accord with the Treaty. This is the *Myoko*, of 10,000 tons, thirty-four knots, and eight 8-inch guns, which is to be commenced at Kure Dockyard in February. Material for the ship is already being collected, and her construction is likely to be rapid.

Circumstances have conspired to overlay the significance of French naval policy since the war. The program adopted in 1921 was small in itself, and even negligible by comparison with the far-reaching plans of other countries which were in process of execution some two and one-half years ago. But then came the Washington agreement, which swept these grandiose schemes into the limbo of things that might have been. The French program survived, however, and the first part of it is already taking shape, while the second and most important part was approved by the legislative bodies during the past year. The scheme as a whole provides for the following new construction. Three cruisers of 7,875 tons, six cruisers of 10,000 tons, twenty-one destroyers of 2,400 tons, thirty-six destroyers of 1,400-1,450 tons, four submersible cruisers of 3,000 tons, thirty submarines of 1,300 tons, six submarines of 1,100 tons, and six of 680 tons, besides one aircraft-carrier of 23,000 tons—113 ships in all. If the whole of this material is duly built—and thirty-three of the ships are now under construction—the French Navy will be well on the way to regaining its former status, and will in any case dominate the Mediterranean. Taken in conjunction with the aerial supremacy which France now enjoys, her naval preparations assume an importance far beyond that which is commonly attached to them. Ignoring foreign programs which are still in the paper stage, France has today a larger aggregate of naval tonnage authorized or actually in hand than any other Power. Her faith in the submarine arm

is attested by the large number of these craft which have been voted in the last two years, forty-six in all, including four vessels that approach the British *X-1* in size and military power.

In view of the generous provision she has made for sea defense, it is not easy to see why France should affect to be so purturbed by Italian efforts in the same direction. Since the peace Italy has laid down no fighting ships with the exception of a few destroyers left over from the war program. The new Italian building plan recently approved, which comprises only five light crusers, twenty destroyers, and twenty submarines, is not due to be completed before 1929, by which date the last of the 113 new French units ought to be in service. France, so far from losing ground as against her Italian neighbor, will soon be in a much stronger position than she is at present. Moreover, unless the large expansion of her torpedo and submarine flotillas is offset by a corresponding increase in the light forces of other navies, she will have effected a considerable improvement in her relative standing towards all foreign naval Powers. French criticisms of the Washington Treaty are, therefore, difficult to understand. One thing is quite certain; but for that Treaty and the consequent scrapping of so many tremendous battleships abroad, France would now be occupying an almost negligible place in the naval hierarchy. Furthermore, the Treaty has greatly enhanced the relative value of those cruisers and other light forces which are all that France, on her own admission, can afford to build. In sober fact, the Treaty has been a boon to France. The real reason for its unpopularity seems to be that it assumes a co-equality of maritime interests between her and Italy and regulates their mutual strength in battleships on that principle. But since France appears to have lost faith in the battleship, and in any case, had no intention of building more of these ships for the time being, the adoption of a common ration of capital ship tonnage for her and Italy can have no practical effect on her future naval position. France might have had reason to complain of the Treaty had it involved the limitation of all types of fighting ships, but, in fact, it leaves her free to build an unlimited number of the very types which she believes to be most useful for her purpose.

The latest Japanese submarine to be completed, *No. 62,* ran her trials in November outside Sasebo harbor, at which dockyard she was built. This boat appears to belong to the medium class, displacing about 800 tons. On her first trials she carried a company of more than eighty people, including officers, seamen, and dockyard personnel. During the run she dived to 100 feet, and remained at that depth for fifteen minutes.

When submarine *No. 70* was salved a few weeks ago it was found that all her hatches were open. This boat, it will be recalled, foundered near Kooe, while on her trial trip on August 27, with the loss of ninety lives. An inquiry into the disaster was held in November, but no findings have been published. It is assumed, however, that the hatches were opened too soon after the boat emerged from a dive, with the result that water entered the hull and destroyed its buoyancy. On the other hand, some Japanese papers state that a leak started while the boat was submerged, and from this alleged fact they deduce faulty construction.

Some particulars have been published of the disaster to submarine *No. 26.* On October 29 the Eleventh Submarine Flotilla, to which this boat is attached returned to Kure harbor after carrying out manuevers in Hiroshima Bay. As *No. 26* moved to her moorings she was found to be taking water rapidly, and twenty minutes later she sank, bow first, in about eight fathoms, only the tops of her periscopes and wireless mast being visible above the surface. Most of her crew of forty officers and men were on deck at the time, and all were able to escape, though one seaman was injured. Divers who went down soon afterward found that the water

had entered through one of the bow torpedo tubes, the cap of which was defective. It is stated, however, that Rear-Admiral Chujo, commanding the Submarine School, attributes the accident to another cause. Salvage operations began immediately, and the boat was raised in less than a week. According to the *Jiji, No. 26* is of 900 tons displacement and 230 feet long, and mounts a 3-inch gun. At the time of the accident she was commanded by Commander Asayama, senior officer of the Eleventh Flotilla. This was the sixth mishap to Japanese submarines reported during the past year.

RELATIVE WORTH OF THE PARIS BATTLESHIP: "JAGUAR" DESTROYERS CRITICIZED: COMPARISON WITH BRITISH VESSELS: IDEAL SUPER-DESTROYERS: "DUGUAY-TROUIN" VS. ENGLISH "DELHI": MISTAKE OF UNDERGUNNING: "MONTCALM" CLASS: FRENCH VIEWS OF THE BRITISH TERROR TYPE OF MONITORS.—*By J. B. Gautreau, Naval and Military Record,* 26 December, 1923.—The 24.000-ton *Paris* has made good trials at over 20 knots on the completion of lengthy transformations at Brest (tripod mast, long-range firing appliances, modifications to turrets, and internal anti-submarine protection) that add to her superiority over Italian rivals.

Député Denise, in his *Rapport sur le Programme Naval,* condemns the 5.1-inch gun (130mil.), that fires a 25-kilo shell at some 18,000 yards, as being too small for modern contretorpilleurs, and he thinks the 5.5-inch caliber, with its 36-kilo shell, is more suitable in vessels of 24,000 tons and over. Expert opinion is with him in that matter, and there is every chance of the destroyers to be ordered next year carrying four or five 5.5-inch guns of light pattern, with 17,000-meters range. The only destroyers carrying 5.5 or 6-inch guns are the Italian Aquilas of 1,900 tons (three 6-inch) and the ex-Boche 2,300-ton boats (four light 6-inch weapons). In fair weather they possess a superiority of range over all rivals of their class, and would give a good account of themselves in coastal operations, as can be judged from the experience gained on the Belgian coast and in the Adriatic during the Great War. But heavy-gunned vessels of such small size labor under a few disadvantages, viz., they are top-heavy, lively in choppy waters, and their guns, rather low on the water, cannot always be fired with anything like accuracy. Moreover, they train only one weapon ahead, whereas the *Jaguar* will be able to train three guns ahead, and when all points are considered, a duel on the high sea between the *Jaguar* (six 5.1-inch guns at great elevation over the water) and the *Senès* (four 6-inch guns rather low on the water) would have some chance of ending in favor of the former. As to the Italian *Aquilas,* officers who beheld them in heavy seas consider it a mistake, and nothing but *poudre aux yeux,* to overload small and fragile craft with weapons powerful enough on paper, but which they could hardly use when going at high speed. Only those guns count that can be used when needed.

Moreover, fighting ships only training one gun end-on are essentially weak, since one lucky shot may disarm them so far as pursuit is concerned. In this respect the distribution of guns *en echelons,* as in the British *Verdun* and in the French *Bourrasque* (four 5.1-inch), elicits criticisms, as a single shell bursting between the two forward or aft guns might have the effect of disabling temporarily half the armament. Axial distribution of armament has obvious advantages, but has also drawbacks, and many French naval men look with contempt on the lack of originality of the present Paris Admiralty, that is content with copying others instead of striking out on lines of her own, as did Dupuy de Lôme and Bussy and other great *ingénieurs* of the past. The super-destroyers that would meet all wishes and realize easy superiority over all comers would have approximately the following characteristics: viz., Displacement, 2,700 tons;

speed, 35 knots, with 57,000 h. p.; five 5.5-inch guns disposed crossways like the dreadnaught armament, enabling three guns to be concentrated on a target ahead and four on an enemy astern, which would render a destroyer capable of holding her own against many a light cruiser.

As the *Duguay-Trouin* is nearing completion, armchair critics are getting hard on her, some going so far as to contend that the British *Delhis*, smaller by over 3,000 tons, are a better investment, since for the price of two 8,000-ton *Duguay-Trouins* it would be possible to have three 4,800-ton *Delhis*, carrying together eighteen guns (against sixteen). Some are even of opinion that the *Delhi* would have a fair chance against the larger French ship, for the reason that there would be on the English side a smaller target, less vulnerability, which is an advantage greater than appears on the surface, as shown by war experience—the short and low-freeboard *Latouche-Tréville*, for instance, faring better in the Dardanelles than the bulky *Jeanne d'Arc*. Such views are exaggerated: the eight guns of the *Duguay-Trouin* are more powerful and much better protected than the six weapons of the *Delhi*, that are—a few of them at least—very awkwardly placed. At the same time—and this is the most telling criticism against the French type—there is no decisive advantage of caliber to be recorded in favor of a *Duguay-Trouin*, that would take nearly as much as she would give in a duel with a *Delhi*, and, all risks considered, would have interest in using her five extra knots in keeping out of range. Despite their splendid steaming qualities, the 8,000-ton *croiseurs-légers* are to a certain extent a repetition of the blunders made before the war with the British *Sentinels* and with the German *Breslaus*. Undergunning (undercaliber) is the worst, most unmilitary mistake that can be committed, especially in unarmored ships.

The 9,500-ton *croiseur cuirassé Montcalm*, that was to join the flag of Admiral Frochot in the Far East, is to be kept in reserve in Brittany waters, for the sake of economy, and also because the worn-out veteran (1899) is, despite costly mending and patching up, too greatly inferior in speed to the 21-knot *Ferry* (12,570 tons, two 7.6-inch and sixteen 6.5-inch guns) and to the 26-knot *Colmar* (ex-Boche scout of 4,400 tons). Ships auxiliary rôle, considering their weak obsolete battery (two 7.6-inch and eight 6.4-inch weapons), it is a question whether they are worth the relatively large sums expended on them and the high cost of their upkeep. For some unknown reason the Paris Admiralty think otherwise, and have ordered the 9,500-ton *Gueydon* and the 10,000-ton *Condé*, that have been rusting in harbor for the last few years, to be repaired and thoroughly overhauled for eventual service. The late Sir William White, who used to criticize with energetic frankness the creations of his friend M. Bertin, admired these high, freeboard, roomy, and imposing cruisers, although they were undergunned to the British County class, in armament to the Italian *Pisas* and to the German *Yorks*, all of 10,000 tons displacement.

The money being wasted in the repairing of totally obsolete ships causes French naval men to regret the thoughtless wholesale discarding of *cuirassés* that took place on the morrow of the war. For instance, the 15,000-ton *Patries* (four 12-inch and sixteen 6.5-inch, or ten 7.6-inch, weapons), stoutly armored, robustly built, and good for 18 knots at sea, could have been adapted to a certain extent, by means of internal and external transformations, to the actual requirements of coastal warfare, and be rendered unsinkable. They were considered to be excellent gun-platforms and many preferred them to the serviceable *Dantons*. Similarly, the discarding of the 9,000-ton *gardecôtes Henri IV.*, very remarkable in design and practically unsinkable, was much regretted. She was a match for two *Montcalms* and invaluable for duties in shallow waters. Unfortunately, her name was too royalistic for a democratic Navy. Since then

plans have been prepared by the Paris Section *Technique* of modern *gardecôtes* of various types, some inspired from the *Henri IV.*, and mounting four 16-inch guns (with a numerous secondary battery) on unsinkable, semi-submersible 15,000-ton platforms, carefully protected against aerial attacks: a type of short-radius-of-action ship that could render invaluable services in narrow seas and in coast attack or defense.

The retention by the British Admiralty of the remarkable 8,000-ton *Erebus* and *Terror* is looked upon here as being a sign of the times. When they discarded wholesale pre-war battleships superior to most other European battleships in commission, together with all monitors built in the course of the war, British naval authorities showed their firm belief in the maintenance of peace in Europe for a generation to come. Now, apparently, they have changed their opinion, for it is obvious the 10-knot *Terrors* can only be used with advantage in narrow waters at small distance from home, and, as no other European force exists that would at all dare to put to sea in the face of the supreme British armada, those two ships can only be meant for offense: viz., for the bombardment of fleets lying snug in harbor or for long inland bombardment, and Gallic naval men, who much admire their design, consider they are excellently suited for that line of work. They bear some resemblance to the old French *Tempête* and *Vengeur* of forty years ago, that carried two big guns in a forward armored turret. Striking power at long range and practical immunity against mines and torpedoes contribute to make them factors of weight in the balance of European power.

GERMANY

GERMAN DISARMAMENT.—*Naval and Military Record*, 5 December, 1923. —French opinion has lately been irritated by erroneous reports in the Paris newspapers of the British Government's attitude in regard to German disarmament. Both the *Temps* and the *Matin* stated last week that the British instructions sent to the Interallied Commission of Military Control at Berlin were equivalent to the suppression of all further control over German military activities. It was further stated that General Bingham, our representative in the commission, had orders to veto all visits, inquiries, and investigations of a nature calculated to cause the slightest incident. "One may rely on the German Government," the *Matin* added, "to ensure that every visit of the commission shall justify apprehensions of that sort."

As there is good reason for believing that on all matters germane to high politics the leading organs of the French press are subject to official inspiration, the British Government saw fit on Wednesday to refuse these allegations by a semi-official *communiqué*. It points out that, so far from General Bingham having been ordered to pursue a separate policy, the instructions sent to him were in complete accord with the decisions reached by the Ambassadors' Conference on November 27, when a unanimous note was handed to the German *Chargé d'Affaires*, informing him that the Allied Governments reserved to themselves absolute freedom to resume military control operations in Germany, "preserving full latitude in deciding what are the operations whose execution appear to them for the time being realizable and necessary."

It is apparently to the latter part of the sentence that the French papers take exception. Its insertion was admittedly due to the view strongly held by the British Government that inspections should not for the time being be carried out where the appearance of French and Belgian officers would be likely to give rise to "incidents." To appreciate the strong feeling aroused in France over this question of control it is necessary to remember that the newspapers there have for months past been full of

sensational and circumstantial reports of Germany's secret arming. Color is lent to these stories by the fact that the Interallied Commission of Military Control has been hampered in its work, during the great part of the present year, by the refusal of the German authorities to guarantee the personal safety of Allied officers who venture into certain districts of Germany.

In Bavaria, for example, no effective control has been exercised for more than a twelvemonth. What the German militarists have been doing all this time is a question that no one seems competent to answer. It is notorious, however, that armed forces far above the limit permitted by the Peace Treaty are now being maintained in Germany, a fact sufficient in itself to justify the French demand for stricter supervision. On no other subject is it so desirable that the French and British Governments should be in complete accord. Whatever we may think of the policy of France in the Ruhr, few will question her right to safeguard herself by all legitimate means from the peril of a German military revival, which would probably be fraught with as much danger to this country as to France.

GIANT SUBMARINES.—*Naval and Military Record*, 26 December, 1923.—Long messages from Berlin were published last week, giving particulars of the new submarine designs which have been completed by Professor Oswald Flamm, the eminent German constructor. These were first heard of in January, 1921, when the Berlin *Lokalanzeiger* described them as an invention likely to revolutionize the naval policy of the world. Professor Flamm, it appeared, had evolved a new principle of stabilization, which made it possible to build submarines of the greatest dimensions without any sacrifice of maneuvering power or safety. The three designs sketched out at that time were (a) for a submersible cruiser of 1,443 tons, plated over with one and one-fourth inch armor and carrying two 5.9-inch guns in armored turrets; (b) for a larger vessel of 4,870 tons, also armored, and mounting two 8.2-inch guns; and (c) for a monster *U*-cruiser of 8,400 tons, with thick armor and several 9.4-inch guns in turrets. At the date in question the two later designs were only in the preliminary stage. Now, we are told, they are completed.

Germany, unfortunately for herself, is precluded by the Peace Treaty from putting Professor Flamm's theories to the test of practice. At the same time, his high reputation is a guarantee that the designs are quite practicable from the technical point of view. But the question then arises: Would these enormous submersibles have a military value sufficient to justify the cost and trouble of building them? Expert opinion will no doubt be divided on this point. An 8,400-ton submersible commerce destroyer would be a difficult enemy to deal with, for with its thick armor and heavy guns it could put up a good fight against all but the most heavily armed cruisers. On the other hand, there is general agreement that, in a duel between a submersible and a surface ship of approximately equal gun power, the odds would be heavily against the former, since one hit might destroy its power of submersion.

For any purpose other than commerce destruction it is not easy to see the value of the giant submarines visualized by Professor Flamm. They could not safely engage any warship larger than light cruisers. They would require ample depth of water and sea room to maneuver in. Their great bulk would render them liable to detection without conferring immunity against the latest methods of anti-submarine attack. It is no secret that depth charges of enormous destructive power have been manufactured since the war. Further, the big *U*-cruiser would always be exposed to deadly torpedo attack by small and swift contra-submarines like

the *"R"* class, which can stalk their prey in the depths at a speed of 15 knots.

Either as a scout or an ancillary of the battle fleet Professor Flamm's leviathan would be needlessly large; these functions could probably be performed in an efficient manner by boats of less than 3,000 tons. What originally encouraged the Germans to build submarine cruisers was the fact that the medium *U*-boat could be harried, and even sunk, by almost any craft, however small, that carried a light but well-served armament. The first *U*-cruisers were designed mainly for the attack of convoys and their weak escorting ships, and one of them, the *U-139*, did make a very brilliant raid in 1918 on a convoy escorted by *H.M.S. Perth*, whose guns she outranged. The obvious answer to attacks of this kind would be to provide each convoy with an escort ship carrying guns at least equal in weight and range to those of the enemy. Until such ships were available our shipping would probably suffer heavy losses.

As regards Professor Flamm's "secret formula" for ensuring stability, it may be that this has been forestalled by British designers, for it is not to be supposed that the Admiralty would have built a submarine like *X-1*, of 3,750 tons submerged displacement, unless the problem of stability had been solved. It would not be possible, however, to determine the precise value of these German designs without information of a much more detailed character than we are likely to get. What does seem to be established is the fact that enthusiasm for the submarine is as keen as ever in certain quarters in Germany.

GERMANY HAS DESIGNS FOR GIANT SUBMARINES.—By H. C. Bywater, *Baltimore Sun*, 12 January, 1924.—London, December 20.—Rather less than three years ago the naval dovecotes were set a twittering by an announcement from Berlin that Professor Oswald Flamm, Germany's most prominent marine architect, had discovered a new scientific formula which would revolutionize sea warfare. It was found on inquiry to relate to the stabilization of submarines, and would, if the inventor's claims were well founded, enable underwater craft of the mightiest dimensions to be built and navigated with perfect safety. This was in January, 1921. Professor Flamm stated in an interview that Germany, though forbidden by the Versailles Treaty from building submarines, could not be prevented from designing as many of these boats as she pleased, provided the designs did not emerge from the paper stage.

He was at that time working on the plans of three different types of submersible cruisers, ranging in displacement from 1,450 to 7,500 tons, all of which would have armor protection over their decks and sides, and were to carry heavy-caliber guns in armored turrets.

The largest of these three vessels was to mount two 8.2-inch guns, four 3.4-inch rapid-fire guns, ten torpedo tubes and a supply of forty-five torpedoes. All the exposed portion of the hull, including turrets and conning-tower, would be sheathed in five-inch steel armor, impenetrable to small-caliber shells and air bombs.

On the surface she was to be propelled at a speed of 22 or 23 knots by her Diesel engines of 30,000 horsepower, while below water her electromotors would drive her at 12 knots. With oil tanks full, her radius of action would be 23,000 miles, and if in danger she could dive to a considerable depth in one minute. An alternative design was for a submarine minelayer of the same tonnage, carrying, instead of guns and torpedo tubes, a cargo of 1,000 mines, each weighing a ton.

Nothing more was heard about these marvelous undersea monsters until this week, when the Berlin correspondent of the London *Daily News* was able to secure from Professor Flamm some new and illuminating details of

his designs which he has now completed. Had they been available during the war they would, he declared, have made Germany victorious at sea.

The point of the invention is that it insures the maximum stability without recourse to ballast or gyrostat. The professor is inclined to think he has scored a signal triumph over the stupid British naval constructors, who are, he asserts, still groping vainly for the solution he has already found.

Competent naval opinion on this side is unmoved by the sensational claims of this German savant. Attention is directed to the fact that there is a great difference between designing a vessel on paper and successfully embodying that design in steel.

During the war neither Professor Flamm nor any of his colleagues were able to build large submarines with the requisite degree of stability. He makes the following admission himself: "The larger submarines we built toward the end of the war often, in submerging, took a list to port or starboard of as much as fifty-five degrees, which naturally played havoc with the nerves of the crew and sometimes led to disaster."

Now the largest submarine completed in Germany was the *U-142*, of 2,160 tons. She was never sent on active service because she proved unsafe, even after being fitted with a girdle of wood to improve her stability. Yet by 1917 the British had in service their *K* class submarines of 1,880 tons, which not only had the remarkable speed of 24 knots but were able to dive and otherwise maneuver without any loss of stability.

By 1918 the British submarine monitor *M-1*, of 1,600 tons, was completed. She carried a 12-inch gun, weighing with its mount considerably more than 100 tons, and this boat also, despite the tremendous weight on deck, showed no lack of stability. In fact she and her sister boats, *M-2* and *M-3*, are among the safest submarines in the British Navy today.

Nor do these vessels complete the record of British submarine development. While Professor Flamm was laboriously working out his plans for the huge underwater cruiser, which was to revolutionize sea warfare, British naval architects were actually building a submarine that comes near his imaginary boat in size and fighting power.

In *The Sun* of June 4 last I was able to give some particulars of the *X-1*, the record-breaking submarine laid down at Chatham Navy Yard in November, 1921. Incidentally *The Sun* was the first newspaper in the world to publish the correct displacement of this mystery boat. She has since been finished and is at this moment running her maiden sea trial.

On the surface she displaces 2,780 tons, but when running submerged her weight is no less than 3,600 tons. While it is still too early to give more intimate details, it is permissible to say that she has the speed of a battleship, a cruising radius of many thousand miles and an armament heavier than that of some light cruisers.

The building of this enormous submarine is, perhaps, the most crushing answer to Professor Flamm's claim that British designers have not yet been able to solve the problem of stability. It has long been the custom in Germany to disparage and belittle the work of foreign scientists and technicians, but in this case the facts speak for themselves. Clever as German savants undoubtedly are, they might do still greater things if they could only escape from the obsession of their own omniscience.

But what, after all, is the military value of these huge submarines? I know many British naval officers who think it was a waste of money to build the *X-1*, and who would have preferred to see three 1,000-ton boats built in her place. To the layman, who has no time to master the subtleties of naval technique, size may seem a safe guide to the fighting power of a man-of-war, and so it is when they are surface ships. But applied to submarines the rule is apt to be misleading.

Professor Flamm does not explain why the possession of a number of 7,500-ton submersible cruisers would have enabled Germany to win the war. I greatly doubt whether any German naval officer would have made such a claim.

The question is of more than academic interest, for the building of enormous submarines is foreshadowed in other countries besides England. There is a well-defined *métier* for the large diving cruisers included in the new American program. These vessels, it is clear, are designed primarily for long-range scouting and overseas observation duty, and would probably be of inestimable value for operations in the Pacific or Atlantic.

Japan could give equally cogent reasons for building the super-submarines now projected, if not already on the stocks. But these American and Japanese craft are understood not to exceed 3,000 tons, and from that figure to the 7,500 tons of Professor Flamm's design is a big jump.

For reasons too technical to be gone into here, but which all naval readers will readily appreciate, no submarine could ever hope to fight a surface man-of-war of her own weight on equal terms. It follows, therefore, that the undersea mastodon conceived by Professor Flamm is meant to attack commerce; to be in short, a submersible *Emden* or *Alabama*.

In this rôle she might prove an awkward customer to deal with. Her heavy guns and thick armor would make her more than a match for the average type of cruiser that escorted convoys in the World War. If she fell in with such a convoy nothing would be easier than for her to rise to the surface, blow the feebly armed escort ship out of the water with a few 8-inch shells and then proceed to pick off each helpless argosy with gun or torpedo.

If, on the other hand, the convoy guard were a vessel with guns equal in weight and range to those of the raider, the latter dare not make an attack on the surface and would be compelled to remain below water, where, if its presence were revealed—as probably it would be by the hydrophone—it would speedily find itself in the midst of a barrage of depth charges. And one hit from the post-war type of depth charge would send even a 7,000-ton submarine to the bottom with her sides ripped open.

Even as a commerce raider, therefore, the super-submarine would not be invincible. Its advent would necessitate special counter measures, and until these were perfected it might cause serious havoc among shipping. But to every weapon devised by human intelligence, however formidable and novel that weapon may be, human intelligence will eventually find an antidote, and Professor Flamm's gigantic submarine is no exception to the rule.

Apart from commerce destruction and sporadic raids on defenseless or weakly fortified coast towns there is no operation of war in which it could be usefully employed, unless, perhaps, as an adjunct of the battle fleet, and even then its value would be problematical.

From Professor Flamm's own admissions there are still a great many folk in Germany whose thoughts and hopes are centered in the *U*-boat. He himself states that "the German Admiralty is showing a lively interest in his designs," and it is a safe surmise that this interest is more than platonic.

During the first three years after the war hundreds of inventions relating to submarines were patented in Germany, judging from the lists of applications which appeared in the technical papers. When a London newspaper drew attention, some twelve months ago, to this stream of submarine inventions in Germany their publication instantly ceased. Germany's warmongers seem, like the Bourbons, to have learned nothing and forgotten nothing.

Professor Flamm says that when it comes to settling international affairs he has "more faith in the submarine than in the League of Nations." But, as the *Daily News* aptly observes: "Other people, at any rate, will remember that it was her own submarines which settled Germany."

JAPAN

LATEST JAPANESE CONSTRUCTION.—By Hector C. Bywater in *Military and Naval Record,* 26 December.—The keel of a new Japanese cruiser is to be laid at Kure Dockyard in January or February next. This ship, which will be named *Myoko,* is the first of the four 10,000-ton cruisers provided for in the revised scheme of construction adopted last year. A second ship, the *Nachi,* is to be begun at Yokosuka in June, by which date, it is hoped, the damage caused at that dockyard by the earthquake and fire will have been repaired. The commencement of the third and fourth ships of this class will probably be deferred until 1925, as the period covered by the program has now been extended by twelve months. According to the Japanese newspapers, all four of these ships will be uniform in design and armed with 8-inch guns. Japan, it may be noted, has not taken full advantage of her rights under the treaty with regard to the displacement of "auxiliary" ships. Not one of the six cruisers begun since the treaty was signed approaches the authorized maximum of 10,000 tons. The *Jintsu, Naka,* and *Sendai* are of 5,570 tons, the *Yubari* is only 3,300 tons, and the *Kako* and *Furutaka* are of 7,500 tons. Japan would have been within her rights had she redesigned all these ships on a 10,000-ton basis, but reasons of finance were, no doubt, responsible for her decision to be content with smaller ships. Naval construction is very costly in Japan as compared with Western countries. The *Jintsu,* for example, is said to represent an investment of £1,200,000, and the new 10,000-ton ships are estimated to cost £2,200,000 apiece.

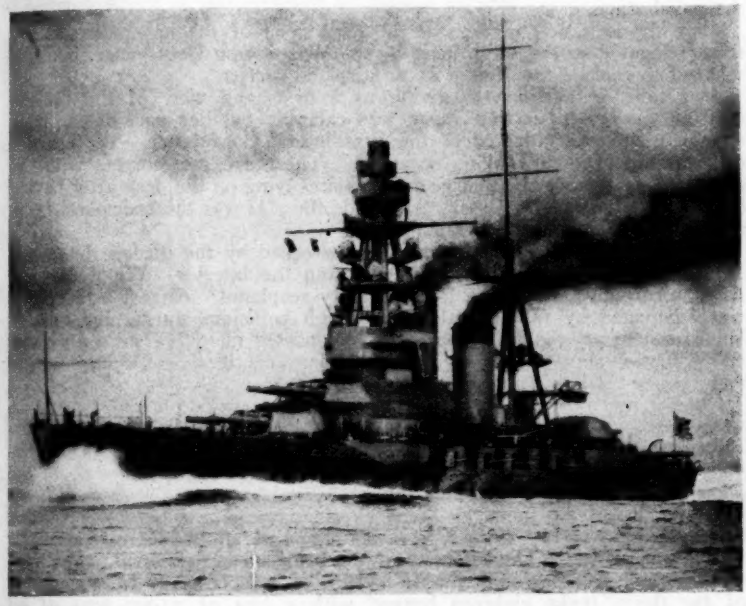
The light cruiser *Sendai* was launched at the Mitsubishi yard, Nagasaki, on October 31, the naming ceremony being performed by Admiral Takarabe, Minister of the Navy. This ship, as indicated above, is of 5,570 tons. She is designed for a speed of 33 knots, and will be armed with seven 5.5-inch guns. Eleven ships of the same type had previously been launched and two more are building. The *Abukuma* of this class went afloat on March 16 last.

Good progress is being made with the *Kako* at the Kawasaki yard, Kobe, and with her sister, the *Furutaka,* at the Mitsubishi yard, Nagasaki. The displacement is either 7,100 or 7,500 tons, both figures having been given in semi-official statements. The armament of these ships is said to consist of 6-inch guns, instead of the 5.5.-inch with which all the cruisers built since the war, seventeen in number, are armed. The 5.5-inch is a popular weapon both on account of its handiness and high rate of fire, but compared with the 6-inch gun it is inferior in range and destructive power. It is an interesting fact, vouched for by a British officer with exceptional sources of information, that the Japanese have never been able to fire as many rounds per minute from a 6-inch gun as European sailors do with guns of identical pattern. No doubt it is purely a question of physique. Between the 6-inch and the 5.5-inch projectile there is a difference in weight of nearly twenty pounds. For use against destroyers or submarines the 5.5-inch is of ample power and range, but as the primary weapon of cruisers which may have to fight ships armed with 6-inch or even larger guns it is too light: hence, the reported decision to revert to a 6-inch battery in the *Kako* and *Furutaka.*

JAPAN REVEALS NAVY LOSS CAUSED IN QUAKE.—*Baltimore Evening Sun,* 28 December, 1923.—Tokio, December 1.—The veil of secrecy regarding the losses caused by the earthquake disaster at Yokosuka, one of the three major stations of the imperial Japanese Navy, was lifted recently when foreign correspondents were taken on a tour of inspection of the harbor and city.

According to official figures the direct losses suffered by the imperial Japanese Navy in the disaster total approximately $50,000,000, while the damage to the Yokosuka naval base is estimated at $35,000,000. I was told that as a direct result of the earthquake three naval officers, twenty enlisted men and about 150 civilian workmen were killed at Yokosuka.

Upon arrival at Yokosuka the correspondents were met by Commanders Ko and Nakamura. A program for the day had been arranged and, with copies of this program, we were given blueprints showing the part of Yokosuka destroyed by quakes and fire. Explanatory notes on the prints gave the following data: 4,000 houses were burned, 14,300 houses were destroyed by quakes, 10,000 houses were partly destroyed, 520 persons were killed, 1,000 persons were injured.



JAPANESE BATTLESHIP "NAGATO"

The damage to the naval station being our prime interest, we spent little time investigating the destruction of civilian property. We alighted first in a large open space and saw the remaining foundation of the Naval Engineering Academy, where more than 300 cadets had been receiving instruction. The buildings withstood the quakes only to be burned to the ground by the following conflagration. The cadets have been transferred to another school.

The next spot we visited was a hill commanding an excellent view of the harbor. Here had stood the naval hospital, with accommodations for several hundred patients—one of the largest and most complete medical institutions of the Japanese Navy. Like the academy, the hospital was completely destroyed by fire.

The heavy brick buildings of the navy arsenal gave mute testimony in their cracked and crumbled walls of the severity of the shocks which

rocked Yokosuka. In some of the buildings, so badly damaged as to be of no further use, we saw groups of coolies salvaging canned goods and other supplies, the fire not having reached them. All buildings that had escaped damage or were only slightly damaged were scenes of intense activity.

We next approached one of the ways where the new battleships are constructed and saw the steel hulk of what was to have been the cruiser *Amagi*, destined to become an airplane carrier as a result of the Washington Conference. The naval officers explained that during the quakes the vessel slipped several feet forward on the ways, while the big beams supporting it underneath sank and caused the hulk to buckle in the center. To make it serviceable would necessitate dismantling and reassembling. This would cost more than it would be worth. Hence the *Amagi* passes from the naval stage.

In a drydock nearby we saw the *Kaga*, one of the uncompleted warships relegated to the scrap heap by the Washington Conference, but now selected to replace the *Amagi* as an airplane carrier.

Our tour, in addition to giving us a first-hand view of the disaster damage, proved to us that Japan was carrying out her part of the navy scrapping program adopted at the Washington Conference. We boarded the warship *Aki*, now being scrapped. There we saw turrets with the guns already removed and large armor plates lying on the deck after having been stripped from the vessel. Alongside the *Aki* was the transport *Asahi*, also doomed to the scrap heap.

The naval-station headquarters were wrecked by the quakes, huge sections of the walls crumbling and exposing the interior. We passed the naval airdromes, where are housed thirty seaplanes. Almost all of them were damaged by falling walls or through collisions during the quakes, but fifteen have been fully repaired. We passed many warships anchored in the harbor, among them being the airplane carrier *Hosho*, the only one now in commission in the Japanese Navy.

One of the most interesting sights was the group of oil tanks along the shore in a small inlet. There raged a seething furnace of burning oil for a week after the quakes of September 1. According to information previously given me, oil tanks were located in the hills behind the city, but the officers said all were situated in this spot on the shore. Oil flowing from leaks sprung in the tanks by the quakes became ignited, and the flaming fluid spread over the harbor, creating a weird and dangerous spectacle visible miles away. The intensity of the heat can be imagined. The steel walls became red hot and almost melted. I was officially informed that of the thirty tanks eighteen burned with a loss of 70,000 tons of oil valued at $1,000,000.

Before the disaster Yokosuka was a city of about 100,000 inhabitants, including 14,000 workmen employed in the Navy yards. Today its population is estimated at 65,000. Doubtless a large portion of this lost 35,000 may be accounted for in the transfer of naval workmen to other stations with their families.

JAPAN'S BIGGER NAVY IS MERELY DELAYED.—By Hector C. Bywater, *Baltimore Sun*, 29 December, 1923.—London, December 12.—Information obtained direct from Japan enables me to present some further details of naval progress in that country, with special reference to new construction.

The Tokio Navy Department announced on October 4 that, in view of the financial burden which the cost of repairing earthquake havoc would impose on the nation, it was ready to make substantial cuts in its budget, but at the same time it insisted on the appropriation of sufficient money to carry on the building of auxiliary warships "deemed essential for the consummation of the national defense program."

The revised naval budget has now been published. It shows expenditure during 1923-24 to have been reduced from 278,000,000 yen to 239,000,000, a saving of 39,000,000, while in the ensuing financial year 238,000,000 yen will be spent instead of the 279,000,000 originally contemplated, a further cut of 41,000,000 yen.

Outlay on the Navy is thus to be reduced by about fourteen per cent in the next two years. Economies on a scale far more drastic than this had been forecast by the newspapers, many of which express dissatisfaction with the amended budget.

Certainly the fact that a sum equivalent to nearly $240,000,000 is to be spent on naval armaments at a time when the country is faced with a bill of $2,500,000,000 for reconstruction furnishes striking proof of the importance which is still attached to defense by sea.

JAPANESE LIGHT CRUISER "YUBARI"

Although the sensational stories of the wholesale destruction of warships and other naval property that got about soon after the earthquake are now known to have been exaggerated, it is officially admitted that the actual losses sustained by the navy were severe.

Yokosuka shipyard and arsenal, together with its naval college, laboratories and magazines, was devastated. One hundred thousand tons of oil fuel were lost when the Admiralty tanks exploded. The giant battle cruiser *Amagi*, converting into an airplane carrier, was reduced to a tangle of twisted steel as she lay on the building slip.

At Yokohama, some miles away, the new scout cruiser *Naka* was thrown on her side by the violent shocks and damaged so badly that repairs are thought to be impossible. Several old ships were also battered by shocks or tidal waves, but as they were due for the scrap heap in any case their loss is of no great consequence.

One of the worst disasters occurred at Hiratsuka, where the navy powder magazine, containing a vast quantity of explosives, caught fire and blew up. Among the ships whose fate is still unknown are the old air-

plane carrier *Wakamiya*, the destroyers *Kashiwa* and *Matsu* and the big oil tanker *Naruto*.

The work of restoring Yokosuka Navy Yard was begun a fortnight after the earthquake and will, it is expected, be completed in about six months.

As the *Amagi* was smashed beyond repair, she will be replaced as an airplane carrier by the *Kaga*, one of the two unfinished battleships condemned by the limitation treaty. As a battleship the *Kaga* was to have displaced 40,000 tons, but in her new rôle her weight will not exceed 26,900 tons. If the scout cruiser *Naka* is found to be incapable of repair, a new ship of the same type will be laid down in her place.

It will not be so easy to make good the loss of fuel oil, which is said to be one-fourth of the entire quantity held in reserve for the use of the navy. Including the stores at Tokio, Yokohama and Tsurumi, over 3,000,000 barrels of oil were destroyed and heavy damage was caused to all tanks in the earthquake zone.

This is a most serious blow to the Japanese Navy, which is largely dependent on imported oil, and has not at present anything like the quantity in stock that would be needed in the event of war. A considerable percentage of the 239,000,000 yen allotted to the navy in the current fiscal year will be spent on the purchase of oil, and in consequence of the destruction of the depot at Yokosuka a new giant tank at Hitonose, near Kure, is being rushed to completion.

According to the *Jiji*, this is the largest tank in the Orient. Built of concrete and rectangular in shape, it has a capacity of 100,000 tons. Tanks of the same dimensions are projected at Yokosuka and other naval ports.

The designs for the new class of 10,000-ton *Washington* cruisers are now complete, and the first two of these vessels are to be commenced in the first half of next year—the *Myoko* at Kure Navy Yard and the *Nachi* at Yokosuka. The keel of the *Myoko* is to be laid in January or February and the ship is scheduled for delivery in the fall of 1926.

Next June is the date provisionally fixed for the laying down of the *Nichi*, as it is doubtful whether the repairs at Yokosuka will be completed before then. Two other cruisers of the same 10,000-ton class will be put in hand before the end of 1924. The leading features of these formidable ships, which were given in *The Sun* as far back as last summer, have since been confirmed.

In size, speed and armament they will outclass not only the American *Omahas* but all other light cruisers now afloat. Each will mount eight 8-inch guns of a new high-velocity type, designed to throw a 250-pound shell a distance of 19,000 yards and fitted with special power-loading gear to facilitate rapid fire. The guns will be paired in armored turrets, so arranged as to give a fire ahead or astern of four guns and a full broadside of eight.

Only light armor will be fitted on the sides of the ships, but there will be thick steel decks over the magazines, machinery and other vital parts. A system of triple-hull construction will render them difficult to sink by underwater attack. A maximum speed of 34 knots is aimed at in the design.

Provision is made for the carriage of sufficient fuel—oil and coal—for a continuous voyage of 10,000 miles at economical speed. Each ship will carry two airplanes on launching platforms and two more in reserve. The main 8-inch battery will be supplemented by numerous rapid-fire guns of 4.7-inch or 5.5-inch caliber, including several on anti-aircraft mounts.

"Light cruiser" is a somewhat misleading term for ships of this class. Ever since the Washington conference set a limit to the displacement and gun caliber of future cruisers, naval architects the world over have been

studying the problem of how to concentrate the utmost degree of fighting power in a ship of 10,000 tons. It is all a question of compromise.

In France and Italy the latest plans provide for an armament of nine 8-inch guns in triple turrets. In Japan and Great Britain, and probably in the United States also, a battery of eight guns of this caliber, mounted in double turrets, is held to meet all requirements, besides giving a quicker rate of fire.

The *Myoko* and *Nachi* are especially interesting because they are the first ships which have been designed in conformity with the rules as to tonnage and gun caliber prescribed by the Washington treaty.

At Kure Navy Yard, which fortunately lies well outside the sphere of the recent earthquake, work is proceeding on the *Akagi*, a sister battle cruiser of the *Amagi*. Like her ill-starred consort, this ship was redesigned last year as an airplane carrier, and it is hoped to have her in commission about two years hence. She will be comparable in dimensions and speed with the United States steamships *Lexington* and *Saratoga* and will be fitted to carry a large number of scouting, fighting and torpedo planes.

Designs have lately been prepared in Japan for a much smaller type of plane carried, with a speed of 33 knots, and it is probable that the balance of about 30,000 tons that will remain over when the *Akagi* and *Kaka* are completed—Japan being allotted an aggregate of 81,000 tons in ships of this type—will be invested in small, swift airplane ships, which would be much cheaper and far less vulnerable than the huge floating airdromes which the three major naval powers are now building.

Of the thirty-odd submarines building or on order in Japan at the close of this year, at least eight have been identified as belonging to the cruiser-submersible type. It is, however, not yet possible to state their exact size with certainty. That submarines of 2,500 tons are now constructing in Japan is made clear by the nature of the machinery which has been ordered from certain firms in Europe.

If this figure represents the *surface* displacement, they are only 250 tons smaller than the huge *X-1* completing for the British Navy. In addition to these big submarine cruisers, with a nominal radius of 16,000 miles. Japan is building many 1,500-ton boats, which would have no difficulty in making a return voyage across the Pacific on one load of fuel.

There is so far not a scrap of evidence which indicates that the unparalleled disaster of three months ago has caused Japan to modify her naval policy to any appreciable extent. Not a single ship of any description has been dropped from the original program, which is to be carried out in full and without amendment except in so far as the date of maturity is concerned, this having been extended by twelve months.

It is due to this extension of the period covered by the program that the economies referred to above have been made possible. They do not represent any reduction whatever in the number of fighting ships and seamen that Japan will have at her disposal in 1928, which is the year assigned for the completion of the post-treaty naval program.

UNITED STATES

ARMY AND NAVY JOINT MANEUVERS.—Radio address by Secretary of War, 14 January, 1924.—The increasing business and commercial value of the Canal is so well assured that the question has been raised whether or not consideration should be given to the possibility that eventually there may be more business than can be handled with the present plant. The average regular rate of passage is approximately eleven transits, all made during the daylight hours. As many as thirty-eight vessels, however, have been sent through the locks in twenty-four hours. With the installations now in existence there can be locked through as many as fifty vessels in

one day, but it is not probable that this number could be maintained as an average for all seasons of the year. If it were a question of the capacity of the locks any necessary increase could be determined and made at comparatively small expense, but there is a water supply question which it may be necessary to consider. During the four months of the dry season the lockages and evaporation from the surface of Gatun Lake use up a quarter of the water supply, and a substantial increase in the number of lockages will lower the level of the lake and decrease the depth of the channel. This, however, is a future question and we are a long distance from the danger mark. If it were necessary to increase the locks or the water supply the cost would be defrayed from the revenues resulting from the increased traffic which caused the extension.

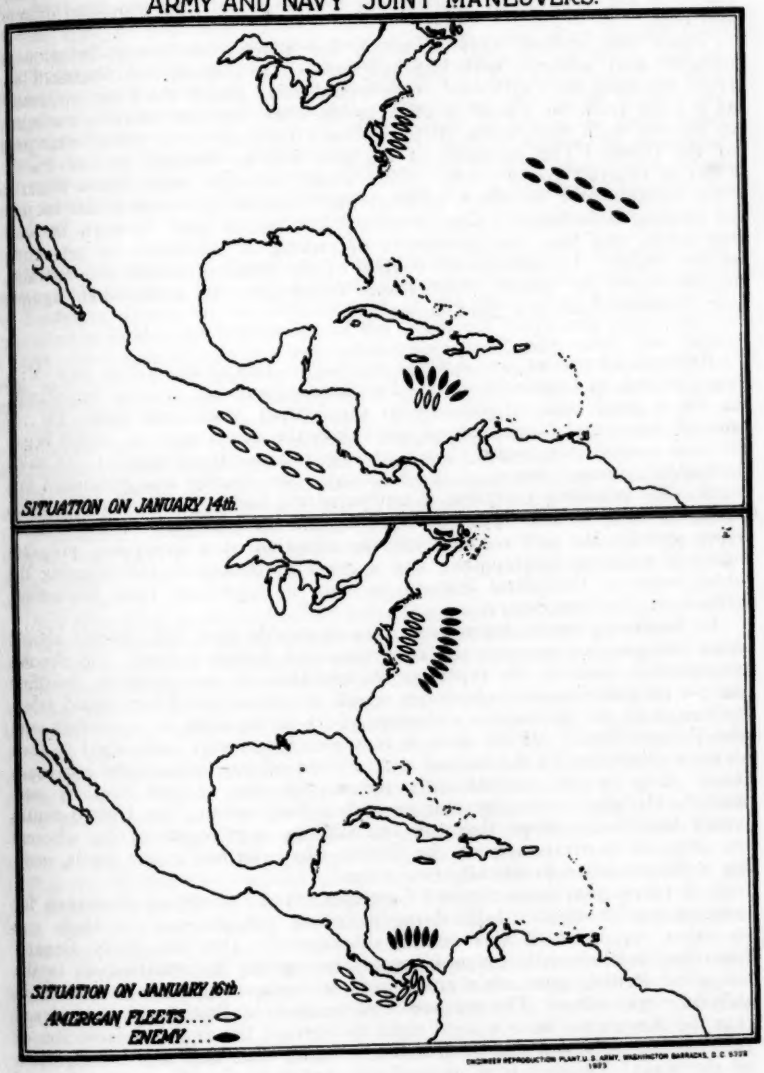
From the standpoint of national defense the Panama Canal has two aspects. In the first place it would have more than normal commercial value in war due to the increased transportation needs then incident to the movement of troops and military supplies. In the second place the Canal enters fundamentally into our plans for defense. Only by its use can we presume that our Navy could be concentrated in time for the most effective operation in either ocean. Upon such a presumption are founded, not only naval plans, but those for the mobilization and operation of our land forces.

One of the most important duties of our Regular Army is to provide that protection which will assure maintenance of the Panama Canal in operating condition under our possession. It must be protected against seizure by a quick thrust so we must not count upon the dispatch of reenforcements after hostilities have become imminent. Men alone will not suffice. Our defense works must be modern, our armament effective and supplemented by the best practicable means for scouting, communication and interior transportation.

There are several ways in which the Canal might be attacked. Hostile agents might injure some vital part of the Canal. Therefore there must be military guards at all such points. An enemy might use its entire naval strength in a great effort to secure its possession. In that event the decisive battle for control of the seas would be waged there. Or again, the enemy might simply endeavor to close the Canal in order to prevent the combining of our fleets. This engagement would be preparatory to the decisive naval engagements between each of our divided naval forces and the enemy's combined strength.

The maneuvers of this year are a test against the kind of raid that may be anticipated. The situation is based upon the assumption that strained relations exist between the United States and imaginary enemies, equal to us in resources, man-power and naval strength. We further assume to have resisted the public demand for consolidation of our Pacific and Atlantic Fleets for fear such an act would precipitate hostilities, but about the first of this month the appearance of an imaginary hostile naval detachment in the middle of the North Atlantic Ocean caused our Government to order its Pacific Force to sail for the Atlantic. The imaginary hostile powers are supposed to have shortly thereafter moved their main combined navies into the Atlantic and ordered a general mobilization of their military forces. We followed with similar orders. The naval force at Panama, consisting of three gunboats is assumed to have been sent on a scouting expedition into the Caribbean and to have reported two days ago that it had sighted a greatly superior hostile force, presumably the first imaginary detachment which had appeared in the Atlantic. Our Atlantic Fleet is being held at Narragansett Bay in anticipation of an attack by the imaginary main hostile fleet, which is superior in strength. Our Pacific Fleet will reach the Canal the sixteenth.

ARMY AND NAVY JOINT MANEUVERS.



ENGINEER REPRODUCTION PLANT, U. S. ARMY, WASHINGTON BARRACKS, D. C. 5-7-29
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Our Atlantic Fleet will represent the hostile raiding detachment, designated as Black, while the Pacific Fleet and the Panama Canal troops will represent the United States, designated as Blue. The Regular Army troops in the Canal Zone approximate a strength of nine thousand officers and men.

There are several ways in which the Black detachment, inferior in number, may attempt, with hope of success, to prevent the Pacific Fleet from reaching the Caribbean. One would be to attack the Fleet piecemeal as it exits from the Canal; another to block the Atlantic entrance; another to destroy with their guns, airplanes or a landing force, some vital part of the Canal. The purposes of the raid will be fulfilled if our Pacific Fleet is delayed for a week. That would give the main Black Fleet a long enough time in which to meet our Atlantic Force and sail to join its raiding detachment. Our Pacific Fleet would then in turn be outnumbered, and have the alternative of risking an encounter or retreating to the Pacific. In either event control of the Atlantic would, theoretically, be possessed by Black. Operations could then be undertaken against our commerce and our land defenses.

British Comment on American Naval Program.—*Naval and Military Record*, 19 December, 1923.—Problems of national defense are coming in for a good deal of attention in the United States just now, for the annual Army and Navy budgets are before the new Congress, which began its first session this month. As a prelude to the introduction of the naval budget, the annual report of the Secretary, Mr. Denby, was published last week. He is asking Congress to authorize the building of eight 10,000-ton cruisers, three "cruiser-type' submarines, and six gunboats for the Chinese river patrol. He also recommends the adoption of a five years' program of naval aviation development, and a grant of £6,000,000 for bringing the older units of the battle fleet up to date in regard to their protection, armament, and machinery.

In justifying these demands it was inevitable that Mr. Denby should draw comparisons between the American and British navies. He devotes considerable space in his report to the question of gun-elevation, dwelling on the serious disadvantage under which the American Fleet would labor, by reason of the inadequate elevation of its turret-guns, in a combat with the British Fleet. "If the British remained at a range just equal to their shortest-ranged ships the fire of over a third of our ships could not reach them. This would automatically reduce the size of our fleet by one-third." He goes on to say that in such a fleet action "the United States would have seven ships that can fire slightly over 20,000 yards, whereas the ships of shortest range in the British Fleet can fire 23,800 yards, making a difference of practically two miles."

It is just a year since the last Congress voted a credit of £6,000,000 for modernizing American battleships, including the increase of their gun elevation, but when it was found, subsequently, that the Navy Department had inadvertently given Congress misleading information as to the range of British guns, this credit was withdrawn and has remained in abeyance ever since. The consensus of opinion in British naval circles is that the Americans have a legal right to increase the angle of elevation of their turret guns, and that such action would not involve any infringement of the Naval Treaty. It is pointed out, however, that if all the ships of the American battle fleet were given a uniform turret-gun elevation of thirty degrees it would then be able to out-range the British Fleet by several thousand yards, and this country would have no option but to make similar alterations in the gun-mountings of all capital ships except the *Hood*. The cost of this would be considerable, but it would have to be

met unless we were prepared to see our battle fleet outmatched in the most important element of fighting power.

The American program of new construction is decidedly moderate. If the eight cruisers are sanctioned they will bring the total of modern ships of this type to eighteen. Japan will eventually have twenty-five such ships, including four of 7,500 and four of 10,000 tons. The British Empire has nearly fifty cruisers, but the great majority of these are of diminutive size or obsolete design. After all that has been heard on this side about the superior strength and efficiency of the U. S. Navy's air service as compared with our own, it is rather surprising to learn from Mr. Denby that "the present situation in this branch, both as to personnel and equipment, is one to be viewed with concern." Only twelve new pilots were added to the roll during this year, and the equipment is "practically obsolete."

OPPOSE PROPOSAL TO MAKE THE NAVY MORE EFFICIENT.—*Boston Transcript*, 17 December, 1923.—New York, December 17.—The proposal made by Secretary Denby of the Department of the Navy that $30,000,000 be expended to modernize battleships of the American Navy and especially to protect them against airplane and submarine attack, has raised the question in Congress of another international conference on limitation of armaments. A thorough investigation of the naval strength of America, as compared with that of Great Britain, France, Italy and Japan, will be undertaken, partly at public hearings, but largely in secret by the House and Senate Naval Committees soon after the Christmas holidays.

Secretary Denby believes his plan to modernize existing battleships is not limited by the prohibitions of the Washington Treaty for the limitation of armament. Some of the "little navy" members of Congress contend it is at least contrary to the spirit of that treaty. The controversy over what Great Britain and other nations are doing along these same lines will be renewed. Mr. Denby's recommendations include:

Deck sheathing as an additional defense against air attack.

Torpedo blisters as additional defense against submarine attack.

The conversion of six coal-burning to oil-burning battleships.

Elevation of guns to increase their range.

Congress allowed $6,500,000 to begin the work of modernization in the last naval appropriation bill, but subsequently a controversy arose over the accuracy of information submitted to Congress by the Navy Department concerning the modernization of British battleships. Last year's appropriation was intended specifically to pay for the elevation of guns, Congress having been told by the Navy Department that the British Navy had done the same thing. That was denied officially later by the British Government and the Navy Department accepted the denial.

But the British Government never has contended that the elevation of the guns is contrary to the Washington Treaty and Secretary Denby insists that it is not, having the backing of all the high officers of the American Navy.

Mr. Denby's request for $30,000,000 to expend on the battleships is inclusive of the $6,500,000 given last year, which was not spent, pending an opportunity by Congress to determine the question in the light of the British denial.

A rider which Congress tacked on the naval appropriation bill for the current fiscal year, will be followed with specific inquiries in Congress to ascertain what this government is doing toward further international conferences on disarmament. The language of the rider is:

"The president is requested to enter into negotiations with the governments of Great Britain, France, Italy and Japan with the view of reaching an understanding or agreement relative to limiting the construction of

all types and sizes of subsurface and surface craft of ten thousand tons standard displacement or less, and of aircraft."

This was adopted with a view to further congressional demands if enough strength could be rallied so that the president could invite the nations to a discussion of the advisability of limiting auxiliary, as proposed by Mr. Denby. Naval authorities will be asked to explain the advantages of all the equipment requested by Secretary Denby.

MERCHANT MARINE

WHY AMERICAN SHIPBUILDING COSTS ARE HIGH.—*Nautical Gazette*, 22 December, 1923.—One of the most serious problems confronting our shipping industry today is the differential in construction costs of vessels built in American and foreign yards. An ordinary freighter can be turned out abroad for at least $40 a ton cheaper than the price an American shipbuilder would have to charge for the same ship. Thus, on a 10,000-ton vessel the difference in capital cost would be $400,000, and on the basis of the usual ten per cent for interest and insurance and five per cent for depreciation, the American-built ship would have to pay fixed charges of $60,000 a year more than its foreign rival on these items alone, a handicap which forces the American product out of the running in the competition for the world's trade.

Because of this wide spread in construction costs American shipowners are going into foreign markets for their new tonnage, and, vital though the matter may be at the present time, it will assume greater significance during the next few years. Since the war there has been comparatively little new construction, our government ships are rapidly obsoleting, and the time is even now at hand when American shipowners must begin to replace their old vessels with modern ships to compete with the up-to-date, efficient vessels which foreign owners are acquiring in increasing numbers. If contracts for these new ships, which American owners must inevitably award during the next few years, go to foreign yards our shipbuilding industry will languish while that of foreign nations will thrive on American business.

Yet the attitude of the shipowner is, in a measure, a pardonable one. Confronted with bids on a new vessel from an American and foreign yard, his business prudence tells him that if his ship is to have any chance at all of bringing in a fair return on the investment, she cannot possibly carry the burden of a higher capital cost than of her foreign competitors, and consequently he gets the ship from the cheapest quarter. In thus placing his contract with a foreign yard the American shipowner is not wilfully unpatriotic, for he would rather see the work go to a home yard, and if the difference in cost were only a few dollars a ton he would undoubtedly place it there, but when the bid of an American yard is nearly double that of a foreign concern he has no alternative but to send the work abroad.

At first glance there appears to be no remedy for this condition. It is natural to argue that our higher standard of living and our protected industries make the American shipbuilder a victim of our economic system, and that for these reasons it is impossible for him to reduce his construction costs. An investigation by *The Nautical Gazette* reveals, however, the fact that while these circumstances do constitute a factor which must always be reckoned with in the costs of building ships in American yards, they are not responsible for the whole trouble and that shipbuilders do not regard the differential as altogether irremediable.

The shipbuilder points out that shipbuilding is not the only industry in the United States that is subject to the conditions imposed by our economic system. Builders of automobiles and locomotives and manufacturers of other steel products all have to carry the same load created by our higher

standard of living and yet, despite this fact American automobiles and American locomotives and American machinery can compete in cost and quality with those turned out in any part of the world. All other conditions being equal there is no reason why American ships should not be in a similar position.

Ship owners themselves are in a large measure to blame for the high cost of American ships, and the very fact that American owners do go abroad for their new vessels is responsible for a considerable part of the differential. Shipbuilding is a highly skilled art, a circumstance which makes it impossible for a shipbuilder to go out and create an efficient organization overnight. It requires several years to build up a shipyard organization that will function smoothly and efficiently in all its branches and turn out good ships. From the executive department, right down through the draughting department to the machinists, carpenters, riveters and even to the unskilled labor, every man must be master of his job. After such an organization has been built up it cannot be readily disbanded without militating against the efficiency of the yard, and the shipbuilder must perforce keep it intact.

The shipbuilder, however, never knows to what extent his organization will be required; whether he can keep it employed for twelve months or one month in a year. After he has finished one job he never knows when he can get another and he is compelled to keep all his men on the payroll, whether he has work for them or not, as he cannot tell at what minute he may land another contract and require them all again. This means that he has to carry a heavy overhead at all times, and that he must make enough money out of one or two jobs to carry the overhead during several weeks or months of idleness. Thus a year's overhead may have to be figured into the cost of a job lasting only a few months, and naturally this increases tremendously the cost of the job. In other words, the shipbuilding must spread, say, five years' overhead charges over work that in the aggregate occupies not more than two or three years. Since it is obvious that he cannot disband his organization at the end of each job and have the men constantly on call at a moment's notice when the next job comes along, he has no other alternative.

The remedy lies, in a large measure, with the shipowner. If all American shipowners would anticipate their approximate building requirements during, say, the next five years, and this is by no means an impossibility, shipbuilders could form an estimate of the amount of business available and so spread their overhead costs accordingly over the whole period, instead of having to load it on to one or two jobs. They could buy steel and other materials to better advantage and make better arrangements with labor on the promise of steady employment, and all of these factors would bring down the cost of each ship. As one prominent shipbuilder expressed it: "The more work given to American yards the cheaper will be the construction costs. I do not say that they can be brought down to the actual level of foreign costs, but they will at least come within gunshot of them. American shipowners must have faith in their own industries and not, as has recently been the case, place contracts abroad for new ships without even consulting American shipbuilders and giving them an opportunity to offer a bid on the work."

The shipyards must also have the co-operation of the government. For example, the Navy Department has recently announced an increase in the wages of its civilian employees in Navy yards, and this is bound to have an effect on wages in private yards. The shipbuilders have protested this action on the ground that any advance in wages which they might be called upon to meet would prove to be a grievous and costly burden to them. Confronted with the necessity of reducing losses the plants are giving serious consideration to downward wage readjustments, and the advance by the government seriously jeopardizes the private shipbuilding industry.

Wages in shipyards are now 225 per cent of the pre-war scale, while statistics show that the cost of living is only about sixty per cent higher than the 1914 levels, and shipbuilders point to this fact to show that any wage advance is unjustifiable. Because private yards cannot keep pace with the government in its wage advances, it is essential that in this direction the Navy Department co-operate with them, and help to bring down the cost of ship construction in the United States and so further the interests of the shipbuilding industry and of the American merchant marine.

RECORD-SIZED MOTORSHIP ORDERED.—*Nautical Gazette*, 15 December, 1923.—The Union Castle Line has placed an order with Harland and Wolff, Belfast, for a passenger liner of 20,000 tons for the Cape mail service. This vessel, which will in many respects resemble the *Arundel Castle*, will be 630 feet by seventy-three feet by forty-six feet, and will have two sets of double-acting eight-cylinder Diesel engines developing a power of approximately 20,000 i.h.p. She is to be built in the new yard at Belfast and will be launched in 1925.

The new Union Castle liner will be by far the largest motorship in the world, and also the most powerful yet designed, and her successful evolution has been due to the close collaboration during several years of Burmeister and Wain, and Harland and Wolff. The application of the Diesel principle to the propulsion of ships marked a distinct advance from the steam engine. The Burmeister and Wain-Harland and Wolff double-acting engine, which is to be installed in the new liner, represents quite as revolutionary an advance from the existing types of Diesel engine. This striking advance in marine Diesel engine practice has been rendered possible by the double-acting construction, without increasing the diameter of the cylinders more than a few inches above the diameters in common use among the numerous single-acting Diesel engines which have been in service for several years.

The special features associated with the double-acting principle have been designed on sound straightforward lines, and thoroughly tested over a period of twelve months with entirely satisfactory results on a full-sized experimental cylinder. The piston is cooled by means of telescopic pipes worked off the crosshead. The piston rod is entirely surrounded by a cooled cast-iron sleeve, which has the effect of protecting the rod itself from all contact with the gases, and, at the same time, enables an exceptionally simple stuffing box to be provided, the absolute reliability of which has been proved by prolonged tests at full power.

This construction eliminates the effects of corrosion and adverse heat treatment of the piston rods, which have previously been considered a source of anxiety in double-acting internal combustion engines generally. One of the drawbacks which engineers have anticipated in the application of the double-acting principle to Diesel engines was the assumed difficulty of providing stuffing boxes that would be satisfactory under the conditions of prolonged service. Another problem which gave rise to apprehension was the necessity of placing the fuel valve away from the center of the cylinder. The designers have, however, got over both these difficulties satisfactorily.

Except for these new features, the constructional features of the double-acting engine are very similar to those of the normal single-acting Diesel engine, which has been doing such good work under ordinary service conditions during the last ten or twelve years. The characteristic types of fuel, starting and exhaust valves and fuel pumps used in the single-acting engine have been retained in the new double-acting design. The general layout of push rods for operating the valves, the cam shaft with double cams for ahead and astern running, the weigh shafts for removing and replacing the rollers during maneuvering, and the familiar reversing gear,

also all follow the firm's standard practice in essential details. Each engine drives its own twin three-stage blast-air compressor off the forward end of the crankshaft. A comparatively small flywheel or turning wheel with electrically driven turning gear is provided aft, and Michell thrust blocks will be fitted. The auxiliary machinery will consist of four single-acting Diesel generator sets, accommodated in a separate compartment forward of the main engine room. Here, also, will be fitted the main fuel settling tanks. The pumps for circulating salt water, fresh water and lubricating oil in the main engine room, and, in fact, all the auxiliaries in the machinery spaces as well as for deck purposes, will be electrically driven. Electrical power will also be availabe for fans, heating, cooking, etc.

ENGINEERING

NAVY MOTOR BOATS TO HAVE NEW ENGINES.—*Army and Navy Journal*, 12 January, 1924.—The Bureau of Engineering, Navy Department, has designed an engine for Navy motorboats in units of two, four and six cylinders, with practically complete interchangeability of parts. It is believed that this engine, built in the three sizes mentioned, will meet all the needs of the bureau for ships' motorboats.

It is intended gradually to replace all the boat engines in the service with this standardized bureau design engine, which should result in a great economy in spare-parts supply, more reliability and more familiarity of naval personnel with motorboat machinery.

The design of the engine is very conservative as regards pressures, cooling and lubrication, which should insure reliability. It provides for two speeds ahead and one astern, and a sliding gear transmission and multiple disk clutch along the lines of automobile engineering, which is believed to be superior to the conventional designs now generally followed for marine practice.

Three of these engines, one of each size, have been manufactured and are now undergoing tests in boats. Their performance to date has been very satisfactory.

ENGINES COMPLETED FOR U. S. SUBMARINES.—*Army and Navy Journal*, 12 January, 1924.—Submarines *S-10* to *S-13*, inclusive, of the U. S. Navy, completed at the navy yard, Portsmouth, N. H., are now operating with the fleet. These submarines are equipped with two six-cylinder engines, designed by the Bureau of Engineering, Navy Department, developing 1,000 brake horsepower at 425 revolutions per minute, modeled after ex-German submarine engines, and built at the navy yard, New York. With the exception of main engine, air compressor troubles experienced on *S-10* and *S-11* soon after commissioning, are now apparently overcome, and these engines to date have proved highly satisfactory.

The six 2,500 brake horsepower, six-cylinder, two-cycle engines being built by the Busch-Sulzer Brothers Diesel Engine Company of St. Louis, for fleet submarines *V-1* to *V-3*, are practically completed. One of these engines has been run intermittently for over a year, and although numerous minor troubles have shown up, which are being corrected, considering the fact that these engines develop more than twice the horsepower of any engine for similar duty previously built in this country, the results are very satisfactory.

There are now building at the navy yard, New York, six six-cylinder bureau-type engines, developing 1,000 brake horsepower at 425 revolutions per minute, for driving generators, electric drive units, for fleet submarines *V-1* to *V-3*, and in addition two similar engines for each of the aircraft carriers *Lexington* and *Saratoga* for auxiliary power. The bureau is also proceeding with the preparation of working plans for engines of

550, 1,400 and 2,350 brake horsepower, to take care of such new construction as may be authorized.

DEMONSTRATION OF "VULCAN" DEVICE FOR HIGH SPEED INTERNAL COMBUSTION HINTS AT LOCOMOTION REVOLUTION.—*New York Tribune*, 15 January, 1924.—Berlin, January 14.—A series of demonstrations of a new invention, known as the Vulcan gearing, has just been concluded at the Vulcan Shipyards. This new gearing is expected to transform trans-oceanic traffic and perhaps play a big rôle in naval warfare, as well. It is predicted, as a result of this invention, that high speed internal combustion engines will ere long be in use not only on board freight ships, but also on big passenger liners, and that we are soon to see the advent of the smokeless, funnelless, trans-atlantic motorships plowing their way through the sea driven by power as invisible as that which drove the ship of the ancient mariner.

Various foreign navies and big shipping companies, among the latter the United States Shipping Board, have been invited to send experts to report on the value of the invention. America, with her newborn maritime ambitions, is taking a keen interest in the new development and is quite alive to the fact that should the claims advanced by the German engineers prove well founded the mercantile marine of the country which first decides to adopt the new method of propulsion stands to get a long start on all other competitors.

During the demonstrations two non-reversible, high speed Diesel engines, with an aggregate of 620 horsepower, producing a speed of 9½ knots in a freight carrier of 2,000 tons, were shown in operation, connected with the propeller shaft by means of a new gearing. Any number of high-speed Diesels can be joined to the shaft, and the combined horsepower of practically any aggregate can thus be applied, with perfect control of each individual engine.

The fact evidently gave rise to a rumor six months ago that a motor ship with engines of 60,000 horsepower was under construction in the Hamburg shipbuilding yard. The Hamburg-American Line has already made tentative experiments with submarine Diesel for freight carrying ships. The *Havelland* and *Muensteriand*, built in 1921 and 1922, are cases in point.

On account of the ever present possibility of temporary interruptions, caused by overheated pistons or some other defect in an engine, no line has hitherto cared to risk installing such high speed Diesel engines on passenger ships. Delays in mid-ocean to execute repairs, though of no great importance on a freight vessel, are a contingency that no shipping company could face with equanimity in the case of a passenger liner.

According to its investors, the new Vulcan gearing has overcome this serious drawback. The new mechanism consists of a combination of the hydraulic clutch and cogged gearing, inserted between each engine and propeller shaft. It permits of simultaneous use of two, four, six or more high speed non-reversible Diesels, so connected with the shaft that at any moment one or more of them can be switched off without interrupting the action of the remaining engines on the propeller. This makes possible repairs on the engine without its being necessary to halt the revolutions of the shaft. The new clutch also makes it possible to utilize a small submarine Diesel for the purpose of railway locomotion—a fact of vast importance for a country like Russia, where there is great scope for railway development and where unlimited supplies of fuel oil are easily obtainable.

INDUCTION-SYNCHRONOUS MOTOR CORRECTS LOW POWER FACTOR.—An induction motor, although simple in its construction and operation, is inherently a machine that operates at a power factor below unity, which

has always been an objectionable feature of this type of motor. This power factor varies with the design, speed and load. At light loads the power factor will be from twenty to thirty per cent, at full load from seventy-five to ninety per cent, depending on the speed of the motor, the lower values being for low-speed machines. The synchronous motor

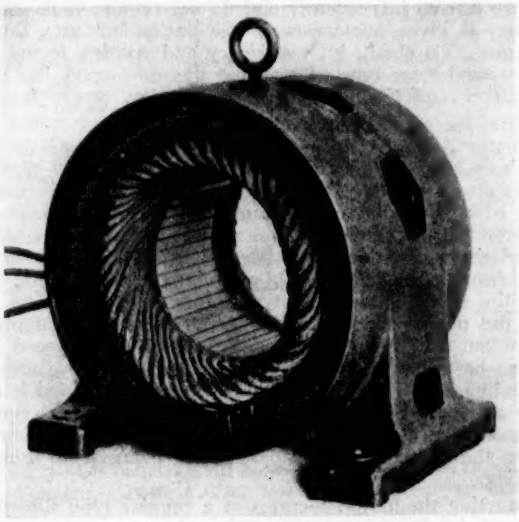

FIG. 1—WINDING IN STATOR FRAME CORRESPONDS TO THAT ON THE ROTOR OF THE USUAL TYPE WOUND-ROTOR MOTOR

possesses the advantage that its power factor can be controlled but is inherently a machine of comparatively low starting and pull-in torque and is suitable only for certain classes of applications. In small high-speed size it has also a higher cost than an equivalent size and speed induction motor.

To obtain a high torque with a squirrel-cage type induction motor requires that the rotor winding be of high resistance, but this means a motor of low efficiency. On the other hand, a motor having a high

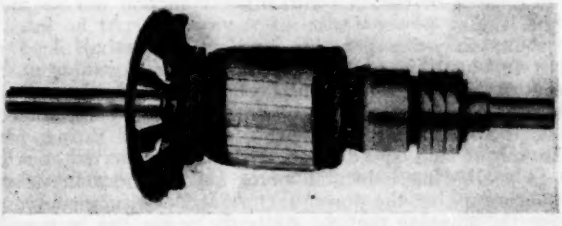

FIG. 2—ROTOR HAS TWO WINDINGS; ONE CARRIES THE LOAD CURRENT AND THE OTHER SUPPLIES EXCITATION TO THE STATOR

efficiency requires that the rotor resistance be low, which will result in a motor of low starting torque. The design of this class of motor may be considered a compromise between efficiency and starting torque, depending on the service to which it is to be applied. For loads requiring frequent starting and high torque, such as on cranes and elevators, efficiency is sacrificed in favor of good torque, where if the motor is designed for loads that are started infrequently and do not require high starting torque, high efficiency is given preference in the design but at a sacrifice in the starting torque. To obtain high efficiency and starting torque in the same motor, the wound-rotor type of machine was developed, but this machine, like the squirrel-cage type, has an inherently low power factor.

To combine the efficieney and torque characteristics of the wound-rotor induction motor with the power-factor characteristics of the synchronous motor has been the object of the designers of the Fynn-Weichsel type, a recent development of the Wagner Electric Corp. This motor has the appearance of a wound-rotor induction motor with a small commutator placed between the slip rings and the rotor windings. The main windings are arranged the reverse of what they are in the wound-rotor type motor. The stator frame, Figure 1, is so wound as to correspond to the rotor winding in the ordinary slip-ring type motor. This winding has no connection to the power source, and is connected to a starting resistance, which is cut out of circuit as the motor comes up to speed in much the same way as on a wound-rotor motor. In the new tpye motor the rotor has two windings, one which connects to the slip rings and is designed for line voltage and corresponds to the stator winding in the regular types of induction motors. The other winding is a low-voltage series winding connected to the commutator, which in turn connects to a section of the stator winding.

During starting the motor operates as a regular type slip-ring induction motor and will develop 150 per cent full-load torque or 150 to 200 per cent full-load current. The motor is started in the same manner as a slip-ring motor, namely, by cutting resistance out of the secondary circuit either manually or with an automatic starter. As the motor comes up to speed, the resistance is cut out of the stator circuit and the machine pulls into synchronism. This it can do with 150 per cent rated load. After attaining synchronous speed it becomes a self-excited synchronous motor. The starting characteristics are the same as those of the usual slip-ring induction motor up to ninety-five to ninety-six per cent synchronous speed, and the motor is so designed that with a load that does not exceed full load by more than fifty per cent. the rotor will continue to increase in speed without change in operating connections, until it pulls into synchronism. Up to the point of pull-in the torque is the same as the usual type of a slip-ring induction motor. Figure 3 shows the load characteristics of a motor designed to operate in parallel with other induction motors and compensate for the lagging power factor of the system. At no load the power factor is about sixty-five per cent leading, at one-half load eighty per cent, and at full load ninety-two per cent leading, becoming unity at about 160 per cent full load. If loaded beyond this point, the motor is pulled out of step, but will continue to operate as a slip-ring induction motor until the load exceeds about 300 per cent full-load rating, when it will stall. The torque and speed characteristics of the motor are not only the same as a slip-ring induction motor beyond the point where it pulls out of synchronism, but the power factors and efficiency curves are similar to those for the slip-ring motor. After the motor has been pulled out of synchronism, if the load is reduced to below the pull-out value the motor will again pull into synchronism.

The motor may be designed for a wide range of characteristics, par-

ticularly in respect to power factor at various loads. If the complete installation is to consist of motors of this type, the design is modified to give practically unity power factor from twenty-five per cent to fifty per cent full load. Between these values of load the power factor will be

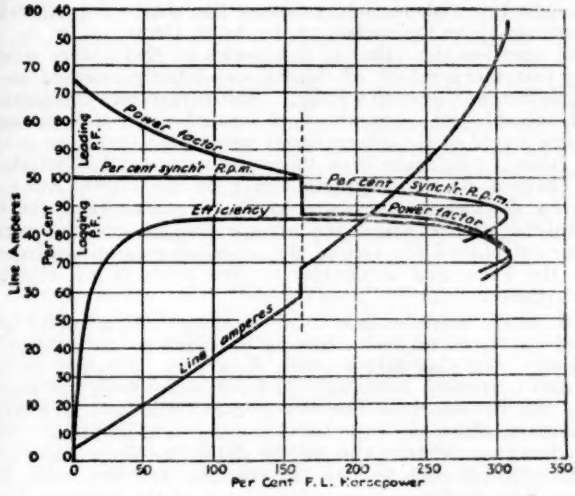

FIG. 3—CHARACTERISTIC CURVES OF MOTOR DESIGNED TO CORRECT POWER FACTOR AND DRIVE A POWER LOAD

slightly leading where either above or below these points it is lagging. At no load the power factor will be about fifty-three per cent lagging where above 150 per cent load it will be practically the same as shown in Figure 3.

The cost of motors of this kind will exceed the cost of the usual slip-ring induction motor, but it is claimed that this excess in cost will be well within that for any other power-factor corrective measure so far employed.

AERONAUTICS

NAVAL POLAR EXPEDITION.—The value of an expedition to the Arctic regions such as the navy proposes to undertake may be outlined under three main divisions: namely, exploration, scientific investigation, and pioneer work for commercial air routes.

As regards the first of these it must be stated that over one million square miles of territory between Alaska and the North Pole has never been explored by man. The belief that land may be found in this great area is strongly supported by reports that have been made from time to time by Arctic travelers. In fact the probable existence of land is indicated on the maps of our Hydrographic Office, though the existence of such land is still in dispute. Keenan Land and Crocker Land are so indicated on the edge of this vast unexplored territory and a question mark appears after the name of each indicating that their existence has not been definitely established. There has also been observed in the Arctic Ocean a variance of the time of tides from what would normally be expected. This variance amounts to as much as three hours difference in the time of high and low water and is said to be explained only through

the existence of an Arctic continent which has never been discovered owing to the fact that the area in which it might be located has never been traversed. Then too, a study of the known map of the Arctic whereon are located Spitzbergen, Nova Zembla, Wrangel Island and New Siberia gives added weight to the probability that the same volcanic influences which brought these islands into existence has also raised other lands yet to be discovered above the surface of the Arctic Ocean.

Lest we question the value of discoveries of this nature it is well to remember that the purchase of Alaska was bitterly attacked at the time of its acquisition as "Seward's Folly." Spitzbergen was considered worthless until valuable coal deposits were located there and we are at the present time aware of the international interest that has been evidenced in Wrangel Island: this, aside from the importance that has attached to the accurate charting of the Northern limits of the North American continent. New theories of oceanography have resulted from the discovery that Greenland was an island and not a continent, and the work of explorers has established the fact of the so-called polar drift from west to east over the Polar Sea, accounting for the existence of icebergs in the Northern Atlantic.

There is much scientific data to be obtained from a survey of the air currents of the Arctic regions according to leaders in this field of scientific investigation. And that this scientific data may be turned to important practical uses is strongly indicated. In recent years there has been evolved the theory that the upper air currents of the Arctic have an indirect effect on the weather which we experience in temperate latitudes. These conditions in the upper air strata can only be studied by aircraft and a thorough knowledge of them may lead to far reaching and important results as regards weather prediction over a large area of the northern hemisphere. This line of scientific investigation would be a natural function of an expedition such as is planned by the Navy.

Commercial air routes over the Arctic are practicable today if we would take the word of explorers and men who have spent a great part of their lives in the Arctic. As regards distances, certainly the Arctic routes for air travel represent a great saving over any other possible lanes of travel between the lands in the northern hemisphere. An air line over the Arctic between England and Japan represents a saving of approximately one half the distance which must be negotiated through the temperate zone between these two countries. And there is ample evidence to support the belief that these air routes would be preferable to others at certain times of the year, aside from the saving in time and distance which would be effected. Contrary to the popular belief the temperature of the Arctic is not one of intense cold throughout the year. We have this as the consensus of testimony from men who have lived in these regions for long periods. In the summer time it is stated that moderately low temperatures exist on the surface, due to the refrigeration effect of the hold over ice. But this does not necessarily maintain at an altitude above the surface where aircraft would operate. In fact the warmth of twenty-four-hour sunlight would tend to give temperatures comparable to weather which might be expected in more southerly latitudes.

If the Navy can establish exact knowledge of these theories and beliefs either by affirmation or negation, it will have rendered a real service to the cause of world progress. An expedition such as is planned, having for its object merely a "dash to the Pole" would be unworthy of the serious effort involved. The North Pole has been attained and by an American naval officer and a repetition of this achievement would have but scant value. But constructive investigation and exploration along lines such as are outlined are duties consistent with the traditions of the

Navy and services which the Navy owes to its maintenance in times of peace.

The work of exploration carried on by naval officers and the accumulation of scientific data to enrich our knowledge of the world in which we live is not an innovation in naval history. If we would seek precedent for such an undertaking we have only to turn back the pages of history to the achievement of Wilkes, who in 1840, discovered the Antarctic continent operating under orders from the President and the Secretary of the Navy. Again we might refer to DeLong and Melville, Charles Francis Hall and Matthew Galbraith Perry and in our own day to Robert E. Peary. Exploration and discovery have been some of the most important returns rendered by the naval service, aside from its primary service of national defense. Since the World War the Navy has been actively engaged in building up a strong air arm to co-operate with the fleet and if, as a corollary to this, important work of discovery and scientific investigation and pioneer work for air commerce can be accomplished, it will be added justification for the development of naval aviation.

Floating Moorings for the "Shenandoah" Vital to Pole Trip.—*Boston Transcript*, 14 January, 1924.—A new type of naval vessel, designed to be a mother ship for airships and to provide a mobile base for these huge air scouts, has been evolved to meet conditions which will be encountered on the Navy's Arctic air expedition next summer. Two ships have been selected for conversion into airship tenders and will be used to push the base of operations for the expedition as far north as practicable before the aircraft are sent on their mission of exploration. They are the *Ramapo* and the *Patoka*—at the present time in use as Navy fuel oil tankers.

The airship tender will greatly facilitate the work of the Navy aircraft in flying over the unexplored regions of the Polar Sea, but of even greater importance is the fact that once more naval architecture has felt the influence of the development of air power. A new type of vessel will soon make its appearance in the American Navy, which promises to be an essential unit in the fleet organization.

When the Navy's Arctic Air Board sat down in conference under orders from Secretary Denby to devise ways and means for the carrying out of a Polar expedition by air and analysis of the problem led at once to some very definite conclusions. It was obviously impracticable to send airship or airplanes cruising off in the direction of the North Pole on their own resources. A northern base as close to the proposed area of operations as possible was determined to be a highly desirable, if not an altogether essential requisite. Land bases first came under consideration and the Polar map was studied for possible locations, Alaska, northern Greenland, Spitzbergen, Wrangel Island and Cape Colombia, where Peary started his final successful dash to the Pole, all came under consideration and for one reason and another the vicinity of Nome in Alaska was selected as a land base.

But the instinct for the sea and dissatisfaction with the immobile character of a land base caused this board of navy sailormen to cast about for a more seagoing solution to their problem.

"Why base on land," asked the members of the Arctic Board, "when open water stretches between you and your goal?"

"Why start from Nome when you can start from a ship several hundred miles to the northward of Nome?"

There appeared to be only one answer to that and the airship tender was next introduced for consideration. At that particular time no member of the board had ever been shipmates with an airship tender and even at this writing the only craft of the kind exists in the form of a varicolored

pencil sketch in the Bureau of Construction and Repair of the Navy Department. It was a brand new idea but it met with a warm reception.

Essentially the tender or mother ship for airships consists of a mooring mast mounted on the deck of a naval vessel. The idea is unique, but thoroughly practicable according to naval constructors and aeronautic authorities.

The mooring mast is in itself a comparatively new departure in aeronautic equipment. It is a mast of steel framework at the top of which is located appropriate gear for the mooring of airships. The original design was evolved by the British in the later days of the war. With the exception of one located in England only one other mast exists in the world and is located at the home port of the airship *Shenandoah* in Lakehurst, N. J. The mast at Lakehurst is a tower of steel 165 feet high. At the top is located a working platform and a gimbal bearing with a securing device for tying up the *Shenandoah* by the nose. Throughout the center of this mast an elevator travels from the ground to the platform and is used to carry men and supplies to the ship. Pipe lines for the transfer of helium gas, fuel and water lead up through the tower to flexible connections for servicing the airship. At the base of the mast are located powerful electric winches for hauling in on the securing lines of the airship once she is in leash.

When the ship is moored to the mast she may swing like a weather vane with the wind, firmly held to her mooring point. Experiments in England have demonstrated the great convenience and usefulness of these towers. At one time the airship *R-34* was secured to a mooring mast for five months, only entering the hangar for one day during this time for minor repairs. In this period, which extended from January until June, the ship rode gales of more than fifty miles an hour while at the mast and no damage was sustained. As a matter of fact the mooring tower is the only safe port for an airship in a storm according to aeronautical experts. To place one of these huge airships in a hangar or to take one from the hangar when high winds prevail is to invite damage against the sides of the shed. But to cast off from the mooring mast and float down wind away from it, or to nose into the wind while securing lines are made fast and then draw the nose snugly down to the top of the tower is no trick at all.

The Navy's plans contemplate masts of this character at strategic points throughout the country such as Fort Worth, Texas, where the helium supply is obtained from natural gas wells and on the Pacific coast at San Diego and Seattle. These points will undoubtedly be stop-over ports for the *Shenandoah* on her way to Alaska next summer. It is also planned to erect one of these masts at Nome. The mooring masts which are already under construction for these land bases are semi-portable. That is, they may be knocked down and stowed conveniently for shipment and reassembled and erected in the course of a few working days. The portable mast is in itself a navy innovation on the permanent type developed by the British. But the novel idea of adapting the mast to use on shipboard is truly a characteristic piece of Yankee ingenuity.

The *Ramapo* and the *Patoka,* which were selected for conversion to airship tenders, are single-screw vessels of 16,800 tons displacement, 477 feet long and sixty feet beam. Most of the interior, according to present arrangement, is taken up with stowage tanks for oil and gasoline. The sketch of the ships as they will appear when converted shows a steel tower of triangular cross section consisting of three main vertical elements, diagonally braced. The mast rises 115 feet above the water line. It has much the same appearance as a high tension electric tower or one of the masts of a high-power radio station. At the top is a platform and gangway for the passage of men into the body of the airship, and above this platform the gooseneck swivel is located which secures the nose of the

ship. On deck the winches for hauling in and slacking away on lines are provided as in the case of the masts on land. Similarly pipelines are provided for carrying fuel, gas and water.

When the airship is about to make a mooring at her berth, the small boats from the ship will be used to handle the lines between the airship and the mother ship. After the nose of the airship has been secured to the mast she will float gracefully over the stern like a giant commission pennant and will swing easily to the wind.

All the equipment is to be found on the shipboard mast except the elevator. And whoever heard of an elevator on a navy ship. The crew of the dirigible will climb the mast to their sky ship in sailor-like fashion.

The airship tender will carry on board complete spare parts for the engines and other auxiliary machinery of her giant air sister. Tanks of the non-inflammable helium gas will be stowed on board and there will be ample machine-shop facilities for repairs and necessary mechanical work. Also there will be shop space for fabric work on the canvas covering of the airship and her twenty gas cells which hold the bouyant helium gas. Instrument laboratories will be provided where the delicate navigational instruments may be repaired and checked, and where the radio apparatus will be overhauled. Not the least important will be comfortable quarters for the airship's crew where the men may seek rest and relaxation after a long flight.

On the deck amidships of the vessel is provided a space for the carrying of seaplanes. These will be important units in the expedition and will be used for short distance reconnaissance work over the Arctic. It is expected that two or three plans will be carried on each ship. They will be of a type such as has recently been developed by the Bureau of Aeronautics for long distance scouting and bombing operations. Specially designed for stowage on shipboard these planes may be stored with their wings folded back to economize space after the fashion of birds when they alight. Each plane will be equipped with a radio sending and receiving set for communication with the mother ship when away on a flight. In fact radio will play a vital part in the operations of the expedition. Airships and tenders will keep in constant touch with each other by radio. The airship will also be able to keep track of its position when out of sight of landmarks over the Arctic ice pack, by means of radio compass bearings from the tender.

It is quite likely that navigation by this means will be relied upon to a great extent for there will quite probably be serious difficulties in the way of using ordinary means of navigation in the Arctic. For one, the magnetic compass will probably prove wholly unreliable under the influence of the magnetic forces known to be prevalent in northern latitudes. And the gyro compass, upon which mariners have come to rely in later years, is not to be depended upon in latitudes north of seventy degrees.

The final touch to the new airship tenders to fit them for their Arctic voyage will be a sheathing of hardwood obtained from the interior of Honduras. This will be secured to the outer plating of the vessels around the bow. It will protect them from the crushing blows of floating ice which might be encountered.

Thus will be fitted out the ships which will carry the Navy's expedition into the far north, and in them the Arctic Air Board find a seaman's solution to the problem of basing an airship and airplanes close to the Arctic ice pack.

It is planned to send one of these ships through the Bering Strait as far north into the Arctic as ice conditions will permit. The other ship will go to Spitzbergen and the eastern side of the Pole and stand by for a transpolar attempt by the *Shenandoah*. The airplane which will be carried

on board will be used for scientific and photographic flights in localized areas.

As regards the use of mooring masts on ships as a strategical measure, Rear Admiral Hilary P. Jones, former commander-in-chief of the Atlantic fleet and present member of the Navy General Board, remarks, "It is well to bear in mind that if airships are to operate with the fleet, there will be many occasions on which mobile bases with mooring facilities will be vitally necessary. Therefore, the question of fitting masts on ships is not wholly bound up with the expedition under discussion."

This comment was made pertinent to the plan for the Polar expedition submitted by the Arctic Air Board to Secretary Denby. It would be manifestly impossible to place mooring masts on land at every point in the vicinity of which an airship might be required to operate in the event of war. To do so would mean that the earth must be bristling with mooring masts for the chance convenience of possible belligerents. But one or two ships fitted with masts and able to steam under the protection of the fleet to any desired point would provide floating airship bases that leave little to be desired. As a matter of fact minor alterations to any of the ships in the fleet whereby they were fitted with mast heads capable of securing an airship may be a modification that will soon appear in the Navy.

"DIXMUDE," EX-ZEPPELIN, VANISHES NEAR NORTH AFRICAN COAST WITH CREW OF FIFTY MEN.—*Aviation*, 7 January, 1924.—The French naval airship *Dixmude*, which was built for the German Navy as the naval *Zeppelin L72*, and was surrendered to France under the terms of the Versailles Treaty, was probably lost with a crew of fifty men in a storm which was raging on the Northern coast of Africa on December 21. The *Dixmude* is believed to have foundered in the Mediterranean Sea, somewhere south of Sicily. The body of her commander, Lieutenant du Plessis de Grenedan, was dragged from the sea by two fisherman six miles from the Sicilian coast, near Sciacca, on December 28. The officer's body, clad in a service uniform and in a fur coat, was badly mutilated, but the idenification tag on the wrist left no doubt as to its identity.

Although no other trace has been found of the unfortunate airship or the remainder of her crew of fifty at the time of going to press, the discovery of her commander's body led the French navy department to issue an official statement that the government had given up all hope for the *Dixmude*, believing that she had met disaster.

The *Dixmude* started on this fateful flight on Tuesday, December 18, from the main French naval airship base at Cuers-Pierrefeu, near Toulon, whence she was to have carried out a seventy-two hour practice cruise over the Mediterranean and North Africa. The purpose of this cruise was to determine one way or the other the controversy which has for some time been raging in French naval and parliamentary circles as to whether large rigid airships were worth the huge expenditure involved owing to their value as naval scouts.

Every year since the signing of the Versailles Treaty, under which France received from Germany three Zeppelin airships—the *L72 (Dixmude)*, the *LZ120* and the *Nordstern* (now the *Méditerranée*—the French air department included in the budget a large sum for the construction of rigid airships and airship bases, and every year Parliament cut them out, allowing only money enough to operate the surrendered Zeppelins. A powerful airship base, with a hangar nearly as large as the one at Lakehurst was thereupon built by the French navy at Cuers-Pierrefeu, and from there the *Dixmude* and the *Méditerranée* were actively employed in practice flights and naval maneuvers. The *LZ120* was broken up for pur-

poses of investigation and also because she was too old a type to be of military value.

But though the *Dixmude* was three years old when she was lost, she was by no means an obsolete, nor an experimental airship. She was of practically the same type as the *L70* with which the Germans made several bombing raids against England, but the *Dixmude* embodied much of the experience so gained and was considered much stronger and air-worthier. She had a cubic capacity of 2,400,000 cubic feet—300,000 cubic feet more than the *Shenandoah*—and she was equipped with six 260 horsepower Maybach engines, giving a total horsepower of 1560, as against 1600 horsepower for the *Shenandoah*. These differences in volume and horsepower together with hydrogen inflation, gave the *Dixmude* a cruising range far in excess of that possessed by her American sister.

A measure of the worth of the *Dixmude* was given on September 25-30, 1923, when this ship made an unofficial world's duration record, remaining in the air 118 hours 41 minutes and covering a total distance of approximately 4,500 miles. This flight took the *Dixmude* twice across the Mediterranean in both directions, from France to Africa and return, and over most of France. A short time before this flight the ship had been equipped with new gas cells, so that she was practically a new ship when she was lost.

It has been said above that Cuers, near Toulon, is the main French airship base. It is, in fact, the only French station equipped with a hangar large enough to hold a rigid airship. There are smaller airship stations at Tunis, Algiers, and Oran, but their hangars can only hold medium sized ships. Though the French air department proposed to erect at Algiers and at Casablanca the large German airship hangars which were shipped in sections to France, it is not believed that these hangars are assembled yet. Furthermore, there was no mooring mast in existence on either shore of the Mediterranean. All these points must be kept in mind in considering the extended practice cruise the *Dixmude* was conducting when disaster overcame her. In fact, the only place within reach of this ship where she could be housed was the big Italian airship shed at Ciampino, near Rome, whose principal occupant is another surrendered Zeppelin, the *Esperia* (ex-*Bodensee*).

Regarding weather reports, a very important item in aircraft operation, it is known that French aerological stations are maintained on both shores of the Mediterranean and in Corsica chiefly for the use of the commercial flying boat services. Whether these stations functioned properly and sent out storm warning by radio, is not known.

Such then, was the ground organization on which the *Dixmude* could rely when she started on her ill-fated trip on December 18. Although we do not know all the points in the case, it would seem as if those responsible for this practice cruise were rather over-confident as to the possibilities of airship operation without adequate ground organizations. It may be argued that the air line distance from Toulon to North Africa is only some 500 miles. What is not taken into consideration is that the path of the airship crossed one of the greatest storm centers of the world,—the area between Sicily and North Africa.

Coming now to the story of the *Dixmude's* trip, or rather that portion of it which is known from radio reports sent by her commander, everything went according to program the first two days. The ship was duly sighted at Bizerta, near Tunis, whence she shaped her course to the oasis of In Salah, in the Sahara, where she turned about and steered northward to Biskra. From then on the voyage became erratic, as the airship was driven back by a tempest, which she fought successfully for at least twenty-four hours till the fuel supply began to fail.

Friday, December 21, she was drifting steadily eastward driven by a gale. In one radio message picked up by a land station Commander du Plessis said he was trying to make a landing; but to bring down a 700 foot airship in a desert in a gale without help is a more dangerous task than was considered by the French authorities possible, and general anxiety was beginning to be felt for her safety.

A message received at 3 o'clock Saturday afternoon at Medinin, on the Gulf of Gabes, made an appeal for help, but the exact position of the airship could not be ascertained, as just as the message was being received her wireless was put out of commission by the storm. From calculation of the airship's position then and the direction of the wind it seemed, however certain that she was somewhere along the coast, and the cruiser *Mulhouse* and several destroyers were sent to search for her and render all possible help if she descended at sea.

By Sunday evening it was calculated that all the gasoline aboard would be exhausted, as when the message was received Saturday she had only two motors working, and had already been in the air a longer time than her supply allowed for. At 11 o'clock Saturday night one Tunisian wireless station picked up a few words of a message which it was believed had been sent out by the *Dixmude*. It was incomprehensible, however, and from then no more radio messages were received from the ship. On December 24 the naval station at Bizerta stated to have overheard radio messages sent to the *Dixmude* and various observers believed to have seen her navigation lights over North Africa, but the Ministry of Marine discredited these reports.

Several airplane squadrons were sent out to patrol the supposed course the *Dixmude* took over Southern Tunis, and naval vessels combed the waters of the Mediterranean—but to no avail.

The mystery was deepened when a French native sentinel at In Salah, in the Sahara, reported that he saw a big airship drifting south out of control at 8 A. M. on December 26. The accuracy of this report is doubted by French air officers, who ascribe it to a mirage, but the man maintains his statement that it was no mirage, nor a cloud, but an airship.

At the Ministry of Marine and at Cuers, where the airship was usually stationed, all but the faintest hope has been abandoned. There seems but little doubt, from the place where the commander's body was found, that the airship was driven by the storm which first struck her near Biskra, on December 19, across Tunis and the Gulf of Gabes out toward Sicily. On the evening of December 20, when the last authentic news was received, she was drifting out to sea. From then on there has been no direct news, only rumor and report that she had been seen and had sent wireless messages that she had been driven back by changing winds over the desert.

On the other hand it is considered as curious that in the comparatively narrow and much frequented sea between the coast of Tunis and Sicily with every ship on the lookout for a wreck no one should have found as much as bits of wreckage had the airship come to grief there. It is scarcely considered possible, unless she was completely shattered by lightning, that she would sink at once without leaving a trace. Judging from the direction and force of the wind, French experts consider that she must have met her fate, either struck by lightning or shattered by storm, when some fifty miles from the Sicilian coast.

There is just a slender chance that the control car of the *Dixmude* was ripped off when she came in contact with the seas, and that the resultant lightening of the ship sent her aloft again with the crew that was not in the forward car. Such an accident, which occurred during the war with a German Zeppelin, might explain why the commander's body was found in Sicily, while the ship was reported drifting South across the Sahara. This assumption would allow hope that part of the crew may yet turn up

alive, although weeks, and perhaps months, may elapse before they are heard from if they landed on some inaccessible oasis.

Regarding the food on board, it is stated that in addition to fresh meat and other perishable foods sufficient for three days, she carried an eight-day supply of biscuits and an eleven-day stock of preserved meat, together with 330 gallons of water, a three-day supply, and her twelve tons of water ballast. A machine gun with 1000 rounds of ammunition and five carbines were also on board.

Lieutenant du Plessis de Grenedan belonged to one of the noblest and oldest families in Brittany. He was born at Rennes thirty-one years ago and spent his life in the Navy. During the war he served as ensign, but in 1917 obtained a transfer to the naval air service and as an airship pilot got command of a small non-rigid airship in the Mediterranean. His skill and eagerness for work won him rapid promotion, and when he received command of the *Dixmude* it was recognized that he fully merited the honor as one of the finest pilots of France.

Lieutenant du Plessis after his record voyage in the *Dixmude* last autumn wrote for a French aeronautical journal an article on the airship which was not altogether favorable. On paper, he said, it can be calculated that the *Dixmude* could travel 9,000 miles at 60 miles an hour, transport innumerable passengers to America or throw bombs on far-distant places, but in reality she could not do any of these things because she was not built for them.

The Zeppelin engineers say she was built only for bombardment. Their task was to hold the air twenty hours, passing across the fighting lines at great height, unloading their cargo of bombs and returning while still dark to their home station. The two models which were delivered by Germany to France under the peace treaty were only designed for such flights and not for long endurance tests.

"Further," the unfortunate commander added, "it should not be lost sight of that even in design the *Dixmude* is defective. She ought to be the last dirigible constructed on those lines. Let us avoid doing again what has been done in this case."

The usual crew of the *Dixmude* consisted of forty officers and men, but on this trip ten passengers, including officers of the Naval Air Service and several officials, went along for observation purposes.

GIANT DIRIGIBLE CONQUERS STORM DESPITE SMASHED PROW.—*Baltimore Evening Sun*, 17 January, 1924.—Another disaster of the air was averted today when the giant United States naval dirigible *Shenandoah*, with twenty-two officers and men aboard, torn from her mooring mast and swept into the night by a seventy-mile gale, beat her way back against the storm and was nosed into her hangar at 3:53 A. M.

For nine hours the airship, partly disabled, fought the elements that threatened destruction.

Then, after being carried as far as Newark, sometimes at a speed of more than a mile a minute, the *Shenandoah* proved herself mistress of the storms. Under the guidance of Captain Anton Heinen, a veteran German Zeppelin expert, the ship was nosed back into the teeth of the driving rainstorm. Slowly her propellers gained headway against the diminishing winds.

The nose of the *Shenandoah* had been torn off completely and flapped from the masthead at the end of her mooring chain. This added tremendously to the difficulty of maneuvering. But at 1:50 A. M. the searchlights at the airdrome picked out of the night the welcome sight of the silver *Shenandoah* safely home.

It was the work of three hours to bring her down. The storm had abated by this time, but gusts of wind persisted in getting into the aperture where the airship's nose-plate had been ripped away.

A ground force of 300 men were on hand to help the dirigible into its nest. Maneuvering with consummate skill, Captain Heinen brought her gradually down, a few hundred feet at a time, cautious, now that the greater disaster had been averted, of the least accident to the ship.

The fact that the *Shenandoah* was filled with helium, the non-inflammable gas used by the United States Navy, alleviated somewhat the fears for her safety which would have been entertained had she been inflated with hydrogen, as was the *Dixmude*.

It was shortly after darkness fell on the fourth day of the *Shenandoah's* proposed seven-day test of her ability to ride out all weather conditions at her mooring-mast that the furious rainstorm proved too much for the dirigible's structure.

Lieutenant Kincaid, acting as officer of the deck, had just finished making an entry in the log when the ship's nose pulled loose.

"Instinctively, Pierce, Heinen and I dived for the levers," Lieutenant Kincaid said. "Within five seconds after the breakaway we had released 5,000 pounds of water ballast, and thus avoided hitting the ground. At that the ship swooped so low, as she started on the mad ride, that the air speed meter, slung seventy-five feet under one gondola, was carried away."

Still losing altitude and in peril of a crash, the crew hurled overboard everything that could be spared. The dirigible had to be elevated at all odds, else a crash was inevitable.

Overboard went the emergency rations, 120 pounds of them. A kit of spare tools lightened the airship's load as it was tossed into the blackness of the night.

Three gasoline tanks, containing 339 gallons, were let go.

Still the *Shenandoah* had enough fuel left for two days.

A quick examination showed that the two forward helium tanks had been destroyed, and that the "away" tank immediately behind them was leaking badly.

Tank covers were used to repair the leaking tank, and to patch the gaping hole in the prow. The fabric had been rent for seventy-five feet back from the prow.

The wind was penetrating to the interior of the cigar-shaped bag, embarrassing the navigator as he tried to get the *Shenandoah* shipshape in the driving gale.

Members of the crew, directed by orders bawled through a megaphone, were kept running back and forth along the narrow plank that runs from one end of the envelope to the other, to keep her head and tail steady.

Engineer Officer Dean released his slip tanks amidships. One fell, breaking a central strut, and also tore a gaping hole in the central fabric.

The men trotting along the plank had to cross a gulf with only the whistling night air between them and the earth below.

After the ballast had been released, however, and the ship gained altitude, her motors started quickly to combat the wind.

"Our first bearing found the *Shenandoah* between Elizabeth and Newark," Lieutenant Kincaid said. "We could see the lights of New York City 1,500 feet below."

The *Shenandoah's* commander was battling with the gale to keep her away from the ocean.

"We drifted across the Hudson, directly above New York City, and passed over the Statue of Liberty," Lieutenant Kincaid reported.

By this time the worst of the storm was over, and Captain Heinen turned the ship into the teeth of the wind and started pounding back.

"The Daughter of the Stars" looked somewhat like a pig with an injured snout. But Captain Heinen and Lieutenant Kincaid agreed the

adventure proves the *Shenandoah* the strongest dirigible ever built. The Polar trip will be an easy matter; a certainty, they believe.

"That gust which tore us away reached seventy-two miles an hour," said Lieutenant Kincaid. "That's four times the velocity of any wind we have to expect in a Polar summer."

Log entries were made every thirty minutes as regularly as though the *Shenandoah* still tugged peacefully at her mooring mast.

Here is an extract from the *Shenandoah's* log:

4 P. M.—Moored to mast as before. Raining. Wind gusty to 56 knots. At 6:44 P. M. ship went adrift. Let go water ballast, including emergency and three gasoline tanks.

8 P. M. Over Newark. Air speed exceeding ship speed by sixteen miles an hour, nautical. Following engines in use—1, 2, 3, 4, 5; 8 P. M. to midnight. Under way as before on various courses over New York City. At 23.20 (11:20 P. M.), No. 3 burned out bottom, stopped. No. 6 ahead cruising. All engines reserve speed. Dropped following slip tanks: one at eighty and 155 and 156. Threw over spare parts and emergency repair tank.

Midnight—Cruising as before on various courses over South Amboy in gale. Making good about four miles per hour to south. Cruising speed all engines. Bow carried away, frame broken, upper fin broken, and outer cover carried away in spots. Making preparations to return to Lakehurst and land first favorable opportunity.

The *Shenandoah* could have landed elsewhere by communicating with the ground by wireless and releasing its helium.

THE TOWING OF AIRCRAFT—BUREAU OF AERONAUTICS.—Under ordinary conditions of sea and wind no trouble will be experienced in taking a plane in tow, but in a heavy sea and high wind the rapid drift of the plane makes such an undertaking difficult for vessels not used to working with aircraft. The pilot of the plane will, as soon after landing as practicable, rig a sea-anchor to reduce his rate of drift. If the seas and wind are high, the vessel should steam slowly across the stern of the plane trailing a long tow line and creating an oil slick if necessary. The line can be readily picked up as the plane drifts over it. This method, in point of time and safety, is the most satisfactory that can be employed in the majority of cases.

Only the most elementary rules can be laid down regarding towing by surface craft for the same situation rarely repeats itself. However, certain fundamentals are of sufficient importance to necessitate following established procedure, departure from which may bring disastrous results.

The towing pendant of *F-5-L* is not strong enough for towing at sea where heavy and unequal strains are placed upon it. The only safe and satisfactory method is a towing bridle of not less than three-inch line, the inboard ends of which are secured around the base of both fore and aft engine "V" struts. The forward end of the bridle should extend just forward of the plane's bow. Stern drags (buckets or sea anchor) when rigged should have their lines led through either hand grip on the tail or the lower horizontal stabilizer braces.

The movable weights should be stowed aft and if necessary several members of the crew should ride the top sides of the horizontal stabilizers.

The center hull compartment should be cleared so that pumping or bailing may be done expeditiously.

Towing up-wind. This is the simplest situation encountered in towing or taxying. In spite of the wind from ahead, the plane will yaw considerably unless the weight is concentrated aft and a tail drag rigged. The speed of towing will depend upon the sea.

Towing cross-wind. Greater difficulty will be experienced under this condition because of the weather-cocking tendency of the plane. To

offset this, a heavy tail drag and perhaps a drag from the lee wing will be required. A windward wing line to the towing vessel will also be of help. If the wind is moderate in velocity, it might be advisable to ride one man on the windward wing to prevent the wind from getting under it and thereby burying the lee wing tip. This tendency marks the initial steps in capsizing. The speed of tip towing varies with the velocity of the wind and the state of the sea. Great care must be exercised by the towing vessel under any but calm weather conditions, and a man should be stationed at the stern to relay messages from the plane to the officer of the deck.

Towing down-wind. Towing down-wind should never be attempted under any but ideal conditions of wind and sea. The plane will attempt to over-ride the towing vessel and will yaw excessively. With light winds it can be accomplished with heavy tail drags and speed equal to if not in excess of the wind.

If the seas are heavy and the wind is strong, far better results can be obtained by allowing the plane to make leeway, but headed directly into the wind. A light sea-anchor may be rigged from bow to keep it from falling off-wind. The bow cock-pit cover should be secured and if the seas are breaking an oil bag should be used. The weight must be placed well aft and it is well to have one or two members of the crew in a position so they can quickly move to one wing or the other.

ORDNANCE

DEVELOPMENT OF ANTI-AIRCRAFT GUNS.—*Current History Magazine*, January, 1924.—Four new types of anti-aircraft guns of remarkable efficiency have been developed. One is a .50-caliber machine gun capable of firing 500 aimed shots a minute. It has a horizontal range of about five miles and a straight-up range of from 8,000 to 12,000 feet. The second gun is a 1.4-inch machine gun, firing an explosive shell of approximately two pounds. The shells are so delicate they will explode upon touching the lightest fabric. At the same time they are entirely safe to handle and to load. The gun is capable of firing from 100 to 120 shots a minute, and has a straight-up range of 14,000 feet. The tracers of the shells are visible to an altitude of 10,000 feet. Third, is a three-inch gun mounted on a special carriage. The traverse arc of fire is no less than the full 360 degrees of a circle. The extreme elevation is eighty degrees. The shell weighs fifteen pounds, has a horizontal range of nearly seven miles and a straight-up range of nearly four miles. Finally comes a 47-inch weapon, regarding the details of which the ordnance officers are somewhat reticent. It is said to be the most effective of the lot. The shell weighs forty-five pounds and has a ceiling of about seven miles. The elevation is eighty degrees.

NAVIGATION AND RADIO

U.S.S. "HANNIBAL" IS MAKING SOUNDINGS IN CUBAN WATERS.—*Army and Navy Journal*, 5 January, 1924.—The U.S.S. *Hannibal*, Capt. E. C. S. Parker, has arrived at Isle of Pines, Batabano Bay, south of Cuba, to begin the season's work of making a navigational chart of those waters.

The *Hannibal* is equipped with the recently perfected sonic depth finder, which facilitates the taking of soundings of great depth. The device, operated by sound which is sent out and reflected back from the bottom of the ocean to a receiver, the time elapsed from the sending of the sound and its return to the receiver measures the depth of the water. A great number of soundings may thus be taken in a very short time as contrasted with the old deep sea led, which required hours to make a single sounding.

Another advantage of the sonic method is that the vessel may take soundings while steaming at full speed.

The airplanes of the Scouting Fleet will work during the season in co-operation with the *Hannibal* and make complete aerial photographs of the area which the *Hannibal* is surveying.

A peculiarity of great value is that shoal spots under water become visible to airplanes at considerable altitude and therefore show up on the photograph. A study of the photograph indicates the location of deep water channels and facilitates their early development. It is expected that the *Hannibal* will remain in Cuban waters until July 1, 1924.

NAUTICAL ALMANAC CHANGES SYSTEM.—*Our Navy*, January, 1924.—Beginning with the issue of 1925, which is now due to be published, the *United States Nautical Almanac* and the corresponding publications in other countries are going to undergo a great change in the interest of safety at sea, this change being effected by agreement of the United States, England and France.

According to *Science Service*, the change is in the method of expressing time. It is now given in astronomical time, the day beginning and ending at noon. In the almanac of 1925 it will be given in civil time, the day beginning and ending at midnight.

In each case the time is that of Greenwich Observatory, the time standard for all astronomical observations. Hours will be counted from 0 to 24, as in the present almanac.

It is further noted in *Science Service* that the changes will do away with an endless amount of confusion and danger, navigators say. The astronomical day begins twelve hours later than the civil day, of the same date—that is, January 1 astronomical time begins at noon January 1, civil time. This difference frequently causes confusion, navigators neglecting to note the change or figuring it as just the opposite. Errors from this cause might amount to as much as ten or twenty miles in working out the position of a vessel at sea. This danger will be ended by the new system, which has been recommended by navigators for years and which will finally be put into effect.

This change made in nautical time will require a new edition of the handbook of every navigator, which has been for years Bowditch's *American Practical Navigator*.

To make this change the burden of the work will fall on the United States hydrographic office.

MISCELLANEOUS

COAST DEFENSE—LOGICAL AND VISIONARY.—By Colonel Henry J. Hatch, C.A.C., and Captain Joseph F. Stiley, C.A.C., of the Coast Artillery Board.—*Coast Artillery Journal*, 15 January, 1924.—Defense against an enemy from overseas demands the closest co-operation between the Navy, Air Service and Coast Artillery. It demands that these three components of our first line defense receive their proper development, not the development of any one element at the expense of the others, but a carefully planned, co-ordinated development of all three. It is by the co-ordinated efforts of these three that an invader may be frustrated before he gains physical contact with our shores.

Propaganda which has appeared in service periodicals and the daily press lately may fail of its ostensible objective—air service development, if such development requires the support of some of the claims made. Ideas that the battleship is defunct, that war has gone entirely into the skies, that coast fortifications are worthless and that armies of invasion with the necessary equipment, hereafter will be transported and maintained

through the air, are extravaganzas today. The propagation of such ideas should be combated. The civilian population of the Central Powers were starved into submission by battleships which all of the bombers, dirigibles and submarines produced by those powers in more than four years, could neither find nor destroy. Their armies were beaten by armies which were escorted across oceans by battleships. Some claims having for a background bombing exercises are based not upon facts but a distortion of them. They can withstand neither debate, the analysis of reason, nor the reflection of recent history. Surely, enough sound reasons founded upon facts and reasonable foresight can be advanced to obtain the sorely needed Air Service development. When money must be spent to increase turret gun elevations in order that our fleet may not meet the fate of Von Spee or Craddock, and to maintain seacoast fortifications designed to spare New York and Boston such raids as Scarborough and Hartlepoole, the fallacy should not be inflicted upon the taxpayer that the battleship and fort are no longer of value and that war now will be decided in the heavens immediately above the earth.

The claim, made so often lately, that the only defense against the bomber is by planes, is fallacious. The *best* defense *against* the *bomber* is a compound of planes, anti-aircraft artillery and concealment. The best defenses *for* the bombers are planes and concealment. Control of the air was an ephemeral thing in France and in most cases was vested, at least temporarily, in the side which initiated a big movement. We have no assurance that an invader will be so lacking in pursuit planes and other aerial defenses at the moment of an attempted landing, that we can bomb him at will from any altitude.

The proposition that our present harbor defenses must be abandoned in view of their vulnerability to bombing attack has been argued with considerable vehemence. The proponents of this idea appear to argue around a stump in claiming on the one hand, that harbor defenses can be bombed with impunity, and on the other, that the fleet which launches bombers against us, can be bombed with impunity also. Such an assumption of conditions is illogical. Given a certain set of conditions, a battleship or a city can be destroyed by a parlor match. Surely fixed defenses are less vulnerable than the ships which will launch bombers. Has it been forgotten that the Allies bombed the Zeebrugge floodgate for four years without success, and that the innumerable efforts of the Germans to wreck the sole floodgate at Dunkirk by aerial bombs were futile? Has it been forgotten that the battle cruiser *Goeben* was run aground to avoid sinking at Nagara, that she was repaired in a week and was cruising the Black Sea in a month, in spite of the sixteen hits made out of an estimated 1,000 bombs that were dropped at her while she was stranded in the Dardanelles? Very little military effect, other than a dampening of the morale of the civilian populations, was accomplished by all of the bombing in the World War. Helgoland, Gibraltar and the Dardanelles were unscathed when the war ended. What sane defensive plan could advocate the voluntary abandonment of such coast denfenses? If it be any criterion, have we forgotten that fifteen years ago, wild-eyed enthusiasts were claiming that cavalry was as "dead as a doornail" because the Wright Brothers finally had made a heavier-than-air-machine leave the ground? Fixed harbor defenses can not be abandoned safely until the visionary premise is established that armies no longer can be transported upon or beneath the seas, or, that an enemy ship, another gallant *Emden*, will be kind enough to forego a bombardment of our seacoast cities until we have withdrawn from the vital "front" and assembled the planes and mobile artillery necessary to compel him to move a little farther offshore.

The harbor defenses of San Francisco, for example, are insurance

against the ransom which can be demanded of that city by an enemy lying offshore, no less than the insurance afforded by planes, anti-aircraft artillery and warships against the bombers of the same enemy fleet. While we are getting so overheated about control of the air which in surprise attacks at least, may rest with the offensive, let us not relinquish control of the surface and the depths of our harbor areas to an enemy armada. Control of the surface, whether sea or land or both, is the gage of success in war. The fixed gun is needed in a certain spot at a time, and under conditions of visibility, and whether, chosen by the enemy, not by our own over-zealous dreamers. One such gun at the critical moment is worth more than all the railway and tractor artillery being rushed madly to the threatened point, and more than all of the bombing planes then in a repair shop or being groomed as carefully as race horses at some distant landing field.

It is realized too infrequently in these days of economy, that the fixed gun and submarine mine are defensive weapons. They are attacked. They defend. Their offensive rôle lies chiefly in offording a secure base for the offensive-defense of the Navy. The mine which is planted, with the proper tamping independently of nose or tail fuse detonators, is an instance of the target seeking the projectile, of an enemy surprise with reverse English.

A moment's thought should convince any man who writhes over his income tax return, of the inherent economy of seacoast artillery and the mine as a part of national insurance against aggression. Those coast defense batteries and other installations which resulted from the Endicott Board of 1886 *still stand*. The best, most costly battleships of the navies of the world at the time our mortar and gun batteries were built have passed from the stage, been scrapped or sunk. In their stead are more expensive ships, little if any less vulnerable to the fire of these same batteries than their prototypes. This cycle will be repeated. Even today a wholesale modification of the battleship is in progress. Bulges or blisters are being tacked onto the hulls as protection against underwater explosions. An armored upper deck, on which it is expected bombs may detonate or break before penetration, is being considered in connection with the loss of stability which such a deck might cause. The *New Jersey* and *Virginia* built in 1904 are on the ocean floor off Hatteras. Battery Anderson's four 12-inch mortars admittedly overmatched such vessels in their heyday. Battery Anderson, or its ilk, overmatched the modern *Colorado*, as the political brainstorm at the Dardanelles proved. The battleship commander who places his ship under the fire of a major caliber seacoast battery for a small part of seven hours is governed by considerations other than prudence. Any artillery battery commander worth his salt will guarantee to put out of action or destroy that ship very quickly. The initial cost of the *New Jersey*, the upkeep and maintenance costs of the ship for twenty years, and the costs of her successor, are an expensive but indispensable insurance premium; the cost of a balanced aerial fleet, with the cost of upkeep and the necessary frequent replacement of these comparatively fragile creations, is probably a more expensive, but equally indispensable premium. Either of these, is immensely more expensive than that premium paid in building and maintaining our seacoast fortifications; yet our cheapest insurance policy is being permitted to lapse, by abandonment to deterioration of some defenses, and by a dangerously alarming depletion of trained personnel in the remainder. With a weakened sea force defending the shores of two oceans, with an inadequate air force, and, with the harbingers of new wars in the press of today, this is the antithesis of economy. A reaction to a sane defensive plan is inevitable.

Too little weight is given by those who went "up in the air" in the controversy over the relative merits of the bomber and the battleship to a consideration of the probable visibility in action. No one is more aware of the vulnerability of a battleship than its commander. His chances for success, in any mission involving action against seacoast, have become more and more restricted due to modern inventions; more and more dependent upon surprise. Concealment is a dominant element of both surprise and security. The ship commander is constrained to choose that condition of visibility most favorable to his mission. Neglecting as problematical the contribution to concealment against planes offered by either lateral or vertical smoke screens, it is apparent that there is a considerable contribution to concealment afforded by fogs which infest much of our coastal waters for extended periods. A ship hidden in a fog is immune to bombing. It can navigate in comparative safety until the fog lifts, and can hear its enemy who can neither see nor hear it. A fog is one of the greatest hazards which the aviator encounters. He is lost while in it and probably is lost when he gets out. Surveillance in thick weather on the waters off our coasts is difficult and the detection of an enemy approach not at all certain; to argue otherwise betrays a lack of appreciation of the immensity of the oceans lapping our shores. Only the seacoast gun, by virtue of developments in subaqueous sound ranging, and the submarine mine, have any probability of hitting the mark in a fog.

On nights when moon and stars are hidden, a ship without lights is concealed as effectively as the proverbial needle. The task of locating a ship by aerial patrol is about as difficult as a search for the needle. Along shore there are many hours during the nights of a year in which such conditions of visibility exist. The pretty picture of ships in a trail of moonlight represents conditions as our dreamers would have them. An inky smear on canvas is the better picture. An all night search of a defensive sea area, by airplane flares, borders on futility. Even imagining that low powered searchlights can be operated from the air, this vertical light is less efficient than the lights of ground stations which can sweep the horizontal plane. A very effective search of the waters contiguous to seacoast fortifications can be made by the lights of harbor defenses. When a ship is some distance beyond the range at which it can be seen by observers ashore, there is enough diffused light from the beam to silhouette the target to an aerial or terrestrial observer who is located in the path of the beam and farther from the light than the ship. Instances are known in which enough light has been thrown upon a vessel to enable a person on deck to read a printed page, light which should enable an aerial observer on patrol to see the ship, yet the ship was not visible from land. The contributions to illumination of targets by starshells from antiaircraft guns which can be diverted to such use is considerable.

The preceding is a concrete illustration of the manner in which the defensive missions of the Air Service and the Coast Artillery overlap and must supplement each other. Undoubtedly, the gun and the mine are the most efficient and most economical defense against ships within the ranges of visibility from terrestrial observing stations, say 20,000 yards. The claim for relative efficiency of the gun is made advisedly, for within these ranges very many accurately directed shells can be fired in the time which must elapse before bombers can climb out over the target, even assuming that we have control of the air. Guns can be kept in instant readiness. The time of flight of a coast artillery projectile is about thirty seconds at 20,000 yards. This is not to argue that bombers and observing planes should not be used within that range to augment and observe coast artillery fire. The co-operation of all arms is necessary in the common mission. Beyond the limits of terrestrial visibility and within the ranges of long range cannon, the relative efficiency of the gun and the bomber is

not so discernible. Observing planes, however, must be available for fire control purposes until subaqueous sound ranging or some other dependable method, is developed for the longer ranges.

The probable situation beyond 20,000 or 25,000 yards is yet another instance of the co-operation necessary to accomplishment of the mission held jointly by the Coast Artillery and Air Service with the Navy; an organization in depth as the first line of defense of the nation. To a sailor the necessity for harbor defenses is not debatable. Even the hardest headed seaman recognizes in the plane another powerful ally (or enemy), and the necessity for equipping fleets with planes and anti-aircraft guns likewise is evident. The security and mobility of fleets is dependent upon aerial *and* shore defenses. Our fast developing anti-aircraft artillery must be recognized as contributing very materially to the missions of the warship and the plane.

The advent of the airplane as a war machine means that it will be utilized by both the attack and defense. It is certain that an oversea enemy will employ air forces to combat the air forces of the defense, to secure information of our dispositions, and to attack seacoast fortifications, defending naval craft and important military and commercial utilities. The defense must be prepared to oppose the enemy in the air as well as on the surface.

The air force of the defense, even if inferior to that of the attack, can give timely warning of the probable enemy objectives.

The anti-aircraft defense, if developed to the normal of efficiency, can not be ignored by the attacker. The anti-aircraft armament at least will force bombers to operate at altitudes at which the percentage of hits to be expected is small. The number of hours of continuous bombing necessary to destroy a single seacoast gun under the protection of anti-aircraft armament probably would be much in excess of that required to sink an anchored and undefended battleship. The latter is a much larger and much more vulnerable target than the former. Bombing planes must operate either under cover of darkness or under the protection of a force of combat planes superior to that of the defense.

In view of the suggestion that has been made that neither battleships nor seacoast fortifications are necessary in the modern war equipment of a nation, it might be interesting to attempt to visualize the situation as it would develop in case of belligerent, in a sane and reasonable preparation, has provided a properly balanced war equipment while the other has placed practically its sole dependence on a superior air force.

First, let us assume that the United States has been persuaded to scrap its fighting ships and seacoast guns on the theory that the next war will be fought and decided in the air. However confident we may be of our own wisdom we must not overlook the possibility that the enemy may not adopt a similar policy for himself. He may insist on keeping his feet on the ground. Suppose he just comes blundering along with his antiquated ideas of warfare and launches his attack not only with airplanes, but with battleships, submarines and destroyers followed by transports (since he has no navy to fear), loaded with land forces and all the old time paraphernalia of war. He anticipates meeting a superior air force if it be given time to concentrate at the point of his attack. He therefore utilizes every advantage of the initiative and weather conditions to deliver a surprise attack. So far as the defense is concerned, everything is staked on the result of the battle in the air. An air victory is necessary for a successful defense but not for a successful attack.

Assume that the enemy arrives off Sandy Hook in one of the fogs so common in that vicinity at certain seasons of the year. It is conceivable that he would be able to open bombardment on New York City before his presence is discovered. With the protection given him by his anti-

aircraft armament, his maneuvering ability, and such assistance as weather conditions afford in the way of concealment and increased difficulty of air navigation, he would be able to continue his bombardment for several hours before a single bombing plane of the defense could climb to the altitude necessary to engage one his ships on equal terms with the anti-aircraft defense. The naval commander approaches the harbor entrance with the knowledge that there are no subaqueous sound ranging equipment and listening devices to reveal his presence, no submarine mine nor defending submarines to hit him below the belt without warning, no high powered guns at Fort Hancock or Fort Tilden to deny him the privilege of taking a squadron of ships on through the Narrows to bombard the city at closer range if he so desires, where he may include in his demand for tribute, the requirement that all bombing planes shall be called off on penalty of further destructive bombardment. As his main fleet lies at the harbor entrance within a few thousand yards from the former powerful fortifications on either side, he congratulates himself that a complacent government has allowed such splendid armament to become junk. He realizes that were that armament still in serviceable condition and efficiently served it would be impossible for him to escape from his present position with a single ship.

He realizes that an attack upon the Coast Defenses of Southern New York or any of the fortified harbors of the United States, once the best protected of any in the world, would not have received an instant's consideration from his government had not the United States surrendered its land and naval defenses to place its sole dependence on a means of warfare which in all nations is regarded as an auxiliary—an important auxiliary but an auxiliary arm of the service nevertheless, just as the cavalry and artillery are auxiliary arms. If he elects to take the chance of subsequent losses from bombing operations of the defense in order to close on the city he may conduct a squadron of his ships into the inner harbor.

As his flagship passes through the Narrows he observes the infantry garrisons of Forts Hamilton and Wadsworth performing admirably the intricate maneuvers of squads right and squads left and he smiles at the idea of economy that must obtain in a government which refuses to utilize the most effective and at the same time the least costly means of harbor defense. He knows that the splendid armament has been removed and that ever since the World War these once powerful fortifications, which frown at him on both sides from a few hundreds of yards, have been garrisoned by infantry battalions instead of skilled Coast Artillery gunners. Before the World War these defenses would have been able to place 100 shots a minute on a target entering the Narrows. Now the frowning fortifications frown and the admiral smiles on his easy access to the inner harbor of one of the greatest cities in the world when, formerly, his chances of passing these same fortifications would have reminded him of the chances of the celebrated celluloid dog chasing the asbestos cat through hell.

While his fighting planes probably are overmatched by those of the defense, the heavy bombers of the latter have not been able, as yet, to climb to one half the altitude necessary to attack him and already he has demanded that they be recalled. Assuming that such demand be refused he may lose one or more of his ships he has brought into the inner harbor, but in the meantime, landing operations at selected points may be carried out by the main fleet without cessation of fire. In order to bomb ships and landing parties, the air forces of the defense must provide not only a large number of bombing planes at every point of attack, but for each such point, a superiority of fighting planes also. If it required seven hours for twenty to thirty bombing planes to sink a defenseless anchored *New Jersey* with bombs dropped from 3,000 to 4,000 feet, it is illogical to

count on the speedy destruction of a fleet of maneuvering men-of-war, each heavily armed against aircraft and mutually self supporting.

Landing parties, once having gained a foothold would not be inconvenienced greatly by bombers or by the feeble resistance a depleted land army could offer. They could organize soon a position from which it would be difficult to dislodge them. It is possible we would regret the brand of economy which prevented the installation and maintenance of the kind of defenses which history indicates positively would have made the penetration of an enemy squadron into one of our greatest harbors an impossibility.

If we as Americans are to exercise our imaginations in attempting to visualize the details of an attack upon us, it would be pleasanter to reverse the supposed methods of preparedness of war of the belligerents. We would find it more satisfactory to assume that our measures of preparation were based on a real economy of forces. These measures should have included seacoast fortifications and heavy mobile guns, as the cheapest and most efficient insurance against enemy occupation of our harbors or open coasts. Our scheme of preparedness should have recognized that each arm of the service has its rightful missions; that in modern warfare the power which places its sole dependence on any of them will be doomed to disaster and that final decision in war must come as a result of infantry combat to which all other arms are auxiliary.

The Navy is a principal component of the first line of defense against an oversea enemy. Its mission is to seek out the enemy navy and destroy it. If successful in gaining and holding command of the sea, the war can not be brought to our shores. Separated as we are by oceans from powerful potential enemies, an efficient navy is an expensive but comfortable insurance, but it must not be our only investment in insurance against war. The navy's most important mission is an offensive one as the best means of defense. It must maneuver in masses large enough to defeat any enemy combination which can be brought against it. It must not be expected to remain in positions of defense along our coast lines where it can be taken in detail by a superior enemy force. Our coasts and harbors can be more economically defended by heavy guns and mines. An investment in fortifications amounting to less than the cost of providing and maintaining a single modern battleship would make any of our harbors so patently immune from direct naval attack that no enemy would invite their sustained fire. Naval battles are decisive, as a rule. The inferior navy will lose command of the sea, but an inferior navy, operating from securely fortified bases can make the transportation of troops to a hostile shore a hazardous undertaking. Our preparedness must include the Navy, the air forces, the fixed seacoast armament, the fixed and mobile antiaircraft armament, the heavy mobile armament suitable for coast defense operations against naval craft attempting to support landings on our unfortified coast lines, and the mobile army with whom the decision must lie once an enemy has gained a foothold. We will have taken then the most effective measures to prevent a war being forced upon us. If we are strong enough our insurance is positive and the guarantee certain. If an enemy, fancying himself more modern than we, assumes that the next war will be fought in the air and fails to utilize the supposedly obsolete warships or field forces, he can not possibly gain a decision over us.

Imagine his supposed approach to our shores with vast fleets of airplane carriers, fighting planes, bombing planes, airships, and such other air contrivances as he may have devised, as the only protection of the main protection to transports bringing his army and war material. We must grant him sufficient sanity to realize that he can not bring his war on us to a favorable decision except by the eventual landing of a field army. We even may concede that he has not gone astray entirely on the

matter of air power and that he has some semblance of a navy. Since his ultramodern doctrine conceives the supremacy of *air power über alles* this navy is perhaps a concession to those who view the future through the glasses of history and reasonable foresight instead of through the spectacles of hysteria.

He approaches Sandy Hook, let us grant, as secretly and successfully as did the more conventionally equipped predecessor whom we have visualized. To have done so he must have avoided or defeated our submarines and fast naval craft which, operating from fortified bases, follow his column for the purpose of sudden raids on any portion of his transport fleet that may be protected insufficiently at any time by war ships. It would have been impracticable for him to include troop ships in his train had not his naval forces first secured command of the sea by the destruction of our main fleet, or else on the assumption that the battleship fleets of both belligerents have been scrapped as a result of treaty agreements prior to the war. However, we are dealing with an illogical enemy, so let us be illogical momentarily, forget our Navy somehow, and permit this overpowering brainstorm in the air to approach our coasts. (We must get them there or we can not finish this article.)

In admitting the possibility of his successful voyage to hostile shores with an expedition composed of airplane carriers, troop ships, repair ships, transports for war material and the like, but without an escort overwhelmingly powerful compared with the sub-surface and fast surface craft of his opponent's regular or improvised naval forces, we are exceedingly generous in the estimate of the possibilities which favor our opponent in the imaginary conflict. Conceding the improbable, it is certain that when the fog lifts it must not find him closer than twenty miles to the harbor entrance, since we are now assuming that the long range guns and mortars of Forts Hancock and Tilden are in serviceable condition and efficiently manned.

The missions of the enemy air force will be, the defeat of the air forces of the defense, the silencing of the fixed and mobile batteries, and the destruction by bombing of important military and commercial utilities of New York City and vicinity. If vastly inferior, the fighting planes of the defense may decline a general engagement and remain under cover awaiting opportunity to concentrate in an attack on any division of enemy bombing planes whose escort of fighting planes is such that a successful attack appears possible.

The batteries of the defense are distributed widely and are difficult to locate accurately. This applies particularly to mobile batteries which may be concealed effectually. The enemy now must reckon with the powerful armament of Forts Wadsworth and Hamilton also. The infantry troops which garrisoned these stations made vacant after the World War by insufficient Coast Artillery personnel are displaced by expert gunners now.

Enemy success in occupying the harbor, or in effecting landings within range of its defenses, is predicated on the destruction of practically every battery of the defense and the clearing of the channels of submarine mines. Should he venture into the harbor or sufficiently near the beach to attempt a landing before all the batteries of the defense are out of action, the result will be disastrous for him. A single battery holding its fire until such a fleet as his has approached to close range, would create havoc with his ships before any number of aircraft could reduce it. Anti-aircraft batteries are located at a distance from the seacoast batteries they defend and their fire would not reveal the location of the latter. They will compel enemy bombing planes to operate at altitudes approximating 10,000 feet, altitudes to attain which requires time, supercharges, and endurance.

How long it would be before this suppositious enemy could feel assured that there was no serviceable armament left to spring a sudden surprise

on his unarmored or lightly armored fleet, should he attempt to enter the harbor, or, how many ship loads of bombs would have been expended before such assurance would be warranted, can be estimated roughly from the bombing demonstrations which have been held against defenseless targets. A conservative estimate certainly would accord much longer life to a battery, even if inadaquately concealed and only reasonably protected by anti-aircraft fire, than was experienced by the undefended *Virginia* and *New Jersey* anchored off Cape Hatteras. Not days but weeks certainly must be consumed in the enterprise under average weather conditions. The enemy commander would have no means of knowing when his job was complete except through the hazardous experiment of attempting to draw the fire of the defense by pushing a sufficient number of his ships to attract it, into the normal zones of fire of the defense. In the meantime fresh mobile batteries would have reinforced the defense, an adequate field army would have been concentrated at the point of attack and the entire naval and air force of the nation could be assembled, not only for abundant protection against invasion but to insure that the ill-equipped attacking fleet should escape with none of its elements. The damage that such portion of the enemy air attack as may have been launched against the city itself could accomplish would be negligible compared with that of the naval bombardment by heavy ships previously considered, which the assumed lack of coast defenses made possible. The attacker, without superior naval strength and depending on air forces alone soon would find his way of retreat cut off by the battle fleets of the defender.

However optimistic the proponents of preparedness by means of air forces alone may be, they sooner or later will be forced to admit that other branches and arms of the military and naval service have their distinctive missions, and, that a well balanced military and naval strength is necessary. An enemy can not transport troops to our shores until his surface craft have undisputed command of the sea. He can not enter our harbors nor approach our coasts in landing operations against big gun coast defenses. If he should succeed so far as to get a foothold on the beach, he must be in sufficient force from the outset to defend himself against the land forces which will close in upon him. His lines of communications with his base must be kept open. His transports must be able to augment his army of invasion at a rate superior to that at which all the land and water transportation facilities of the invaded country can deliver reinforcements to the army which will intrench around him rapidly. The air forces in any war now conceivable will have important missions but they can not do it all and it is to be hoped that intelligent enthusiasm for the development of a powerful Air Service will not weaken the case by grossly exaggerated claims.

NOTE: Discussions of this article will be welcomed both by the NAVAL INSTITUTE and the *Coast Artillery Journal*. Discussions may be sent to the INSTITUTE or to the *Coast Artillery Journal* direct.

NOTES ON INTERNATIONAL AFFAIRS

FROM DECEMBER 23 TO JANUARY 23

PREPARED BY

PROFESSOR ALLAN WESTCOTT, U. S. NAVAL ACADEMY

GERMANY AND ALLIED POWERS

EXPERT COMMITTEES IN SESSION IN PARIS.—The first session of the International Committee of Experts appointed by the Reparations Commission to consider German finances was held in Paris on January 14. General Charles G. Dawes, who was made chairman of the committee, in his opening address stressed the need of unity and declared that the success of the committee depended on "whether in the public mind and conscience of the Allies and of the world there is an adequate conception of the great disaster which faces each ally and Europe unless common sense is crowned king."

It was understood that the first work of the committee would concern itself with the German Budget. Dr. Schacht, president of the German Reichsbank and German Currency Commission, with other German specialists, was invited to Paris and on January 18 conferred with the committee. As a first result of these conferences, it was announced on January 22, that the committee had decided upon the necessity of establishing some form of international bank in Germany, dependent in part on foreign funds, but utilizing also stored up funds of German nationals.

The second committee on German capital abroad, with the British delegate, former Chancellor of the Exchequer Reginald McKenna, as chairman, and Henry M. Robinson as American representative, met in Paris on January 21.

FRANCE AND BELGIUM REJECT GERMAN OFFERS.—Paris, January 11.—This afternoon the French reply to the German note of December 24 which opened direct negotiations between France and Germany for a *modus vivendi* on the Ruhr was handed Dr. Von Hoesch, the German *Charge d'Affaires*. At the same time in Brussels the Belgian Government made its reply to Germany.

The remission of the note to Herr Von Hoesch was accompanied by a verbal explanation which, it is said, was for the purpose of softening the effect of the contents of the note itself. This would seem to support the conclusion that the French reply, which has not yet been made public, amounts to rejection of most of the demands made by the Reich on Christmas Eve.

The indicated rejection was anticipated here, for it was believed that the Germans asked for more than they probably expected to get inasmuch

as they sought suppression of the customs line between the Ruhr and unoccupied Germany, Berlin fiscal control in the Ruhr, German control of Rhine navigation and turning over the Ruhr and Rhineland railroads to German officials with Franco-Belgian supervision, instead of actual operation by France and Belgium. Furthermore the Germans asked for complete reinstallation of all displaced local officials.

It has taken fifteen days for the French and the Belgians to answer the opening German note, and it is very evident that a more speedy process will have to be found if a *modus vivendi* is to be established before April 15, when the local accords between the Ruhr industrialists and the French and Belgian authorities in the Ruhr expire.

SEPARATIST LEADER ASSASSINATED AT SPEYER.—At Speyer in the Bavarian Palatinate, on January 9, the Separatist "President of the autonomous government," Herr Heintz, and four of his associates, were shot and killed by a band of Nationalist students. One of the assailants was also killed, but the rest escaped.

Before this took place the British representative on the Interallied Rhineland Commission had protested against the recognition of decrees issued by the Separatist Government in the Palatinate, and Lord Curzon had proposed to France an investigation as to the genuineness of the Separatist movement. Subsequently an investigation of conditions in the Palatinate was undertaken by the British Consul at Munich.

Before the House of Commons on January 16 the British Undersecretary for Foreign Affairs, in answer to a query, declared that the Separatist movements in the Rhineland and Bavarian Palatinate were not spontaneous but had been "engineered," and that the British Government would not sanction separatism which amounted to the establishment of independent states outside the Reich.

GREAT BRITAIN

ADVENT OF LABOR GOVERNMENT.—On January 21, a week after the formal opening of the new Parliament, the Baldwin Government went down to defeat by a vote of 328-256, practically all the Liberals supporting the Labor party. James Ramsay Macdonald, leader of the Labor party, was called upon to form a new ministry. As announced on January 22, Premier Macdonald himself took over in addition the secretaryship of Foreign Affairs, Philip Snowden became Chancellor of the Exchequer, and Viscount Chelmsford became First Lord of Admiralty. Without a majority of its own votes, it was generally assumed that the new government would be short-lived.

The London *Outlook*, in anticipation of a Labor Government, made the following outline of its probable foreign policies, the points in italics being regarded as more certain:

A. (1) *De jure recognition of the Russian Soviet and resumption of full diplomatic relations, probably on the basis of a treaty of amity and commerce, with special financial and economic agreements designed to benefit British trade and employment.*

(2) *Support for Russian admission to the League of Nations, if Russia can be induced to apply.*

(3) Supplemental negotiations with Russia for the demilitarization of the Black Sea and the Baltic.

B. *A general world conference on the lines indicated by General Smuts to deal with reparations, European reconstruction, Interallied debts, the occupation of the Ruhr.* This conference to meet, whether France decides to attend or not. Should the United States decline to be represented, as is possible in the absence of France, then the Government might, instead of summoning a conference, bring these problems instead before the League of Nations.

In this conference, or alternatively before the league, the Labor Government would resist the imposition by France upon Germany of any terms which would imply French control of Germany's industrial resources to the danger of British industry, and would also take exception to any Franco-German understandings tending to deprive German workers of benefits won by them since the war, such as shorter hours.

C. (1) *The United States will be asked to follow up the Washington Naval Conference by another international meeting to discuss limitation of land and air forces. Failing such American action, the Labor Government would be prepared to summon the conference themselves.*

(2) *The Singapore Naval Base will be abandoned as wasteful, and contrary to the spirit of the Washington treaty.*

(3) An attempt will be made to substitute for the present regional alliances, as suggested by the League of Nations Committee on Disarmament, a general European pact by which every nation will guarantee every other against aggression.

D. (1) *Support for Germany's admission to the League of Nations, with a seat on the Council.*

(2) Relief credits for Germany, enabling her to purchase raw materials and other necessities in this country. This scheme might dovetail into the American proposal to advance food credits for Germany.

E. (1) League of Nations Assembly to be strengthened, and measures taken to reduce the influence of "professional diplomats" at Geneva; which steps, with Germany and Russia on the League Council, would tend to "strengthen" and make more "democratic" the league.

(2) *This country to take the lead among the great powers in signing the Hague World Court Protocol, accepting the principle of compulsory arbitration in any dispute between signatories of the protocol.*

F. Embassy vacancies likely at Washington, Paris and Berlin to be filled by prominent Radical and Labor statesmen and intellectuals. Leavening of the diplomatic service and Foreign Office personnel through the introduction of a proportion of outside recruits. One member of each embassy staff to deal with social and economic problems.

LIQUOR TREATY APPROVED.—London, January 22.—The Anglo-American liquor running treaty is ready for the signatures. All the British dominions have approved it and the British Ambassador at Washington has been asked to notify the United States State Department that Britain is prepared to sign. The treaty, of course, must be ratified by the British and Dominion Parliaments, but, with the possible exception of Canada, where the King's Government is in a nominal minority, there is thought to be no likelihood of an upset of the verdicts already given.

British governmental authorities are now satisfied also that the treaty, as revised, will not conflict in any way with the American Constitution. Apprehension had originally existed that the treaty's proposal to allow British ships to carry liquor stores within the three-mile limit might not

square with the Eighteenth Amendment, and the British Government was chary of extending the privilege of right of search to an hour's steaming from shore until it was certain that it would receive this *quid pro quo*.

Departing from the accepted three-mile limit which has been the basis of British maritime law, Great Britain and her Dominions have unanimously agreed to grant the United States the right to search British owned vessels carrying contraband liquor within one hour's steaming distance of the American shores. For brevity, it is one of the most remarkable international documents on record.

It consists of less than three short typewritten pages and embraces, first, the decision of the British Government granting to the United States a special extension of the three-mile territorial limit; second, the right of the American authorities to search British vessels for illicit liquor within a boundary described as one hour's steaming distance.

ITALY AND SOUTHERN EUROPE

No Spanish-Italian Naval Entente.—From N. Y. *Times*, 11 January.—Rome, January 10.—The Ministry of the Navy denies reports circulated in America that a naval alliance has been made between Italy and Spain to curb the French in the Mediterranean and that orders for warships have been placed by Spain in Italy.

At the office of Admiral Thaon di Reval it was stated that no naval agreement of any kind existed between Italy and Spain or was intended to be concluded in the future. The Director General of Naval Construction said that Spain had ordered no ships in Italy, that no negotiations to that end had been carried on and that there was no prospect of any being carried on in the future.

The Ministry of Foreign Affairs confirmed, that no military, naval or political treaty or agreement of any sort has been concluded between Italy and Spain. The only treaty at present in existence between the two countries is a commercial treaty which was concluded a few days before King Alfonso's recent departure from Rome.

The reports apparently began with an article written for the Spanish press by a Spanish naval critic, saying that the Italian and Spanish navies acting together and using the Balearic Isles as a base could draw an impenetrable line between France and her African possessions.

It is supposed that the discontent with which the result of the Tangiers conference has been received in Spain and Italy's still greater discontent at being excluded from the discussion have furnished an occasion for putting into circulation again stories about an Italo-Spanish offensive or defensive alliance.

Conference of Little Entente.—A conference of the foreign ministers of the Little Entente powers, Benes of Czechoslovakia, Duca of Rumania, and Nintchitch of Yugoslavia, was held at Belgrade on January 11-12. Although the conference had no startling results, the representatives of the Balkan states were reported to have reached agreement on several questions of international policy. It was apparently agreed in principle that the three states should aim at general co-operation with the major powers, rather than close rapprochement with any one nation, and in opposition to M. Benes' reported efforts to draw his allies into combination with France. Following the conference M. Benes left for London.

Regarding recognition of Russia, each nation was left free to pursue the course dictated by its special interests. The position of Czechoslovakia

was defined as similar to that of Great Britain and Italy. Rumania was already seeking to open negotiations with the Soviet Government for recognition by the latter of Rumania's annexation of Bessarabia and of its responsibility for the gold sent to Moscow during the war.

ITALIAN AGREEMENT WITH JUGOSLAVIA.—From N. Y. *Times*, 14 January. —Rome, January 14.—Despite the reticence shown by the Ministry of Foreign Affairs, it is understood that the Fiume solution in its present shape is based on three main points: First, the annexation to Italy of the city and harbor of Fiume; second, the annexation to Jugoslavia of the Delta and Porto Barros, the boundary between the two States being the River Aeneus; third, the creation of an Italo-Jugoslavia consortium for administering the harbors of Fiume and Porto Barros as a single entity.

In addition the treaty will probably contain several economic clauses tending to increase the trading facilities between the two countries.

As far as territorial divisions are concerned, in other words, the treaty recognizes the *de jure* situation which now exists *de facto*.

Italy and Jugoslavia, by examining the Fiume problem together in an amicable spirit, have arrived at a solution which, though disappointing the extreme nationalists in both countries, provides without difficulties and with a minimum of sacrifices for both sides. Fiume being the only outstanding controversy separating Italy and Jugoslavia, the way was left clear for a closer understanding, which resulted in negotiations being undertaken for an economic treaty and for a "bilateral compact."

By this bilateral guarantee the contracting parties, while not entering a formal alliance, declare that they are interested in the maintenance of peace, and that all outstanding questions between them being eliminated, they bind themselves to observe all existing treaties, the present territorial *status quo*, and to maintain an attitude of reciprocal neutrality. It is not unlikely that this somewhat rudimentary understanding may be amplified as negotiations proceed, but such is not the case as yet.

Durable understanding between Italy and Jugoslavia is looked upon with favor in Italy chiefly as furnishing a counterweight to France's alliance with Czechoslovakia which created a certain amount of alarm in Italy. It is pointed out that Czechoslovakia and Poland have strong leanings toward France because they are afraid of Germany, which is an ever present menace to their borders, but that other members of the Little Entente have no such reason for wishing an alliance with France or for preferring France to Italy. It is believed that an understanding between Italy and Jugoslavia will prevent Czechoslovakia's action in allying herself to France from being imitated by the other members of the Little Entente, thus re-establishing some measure of equilibrium in Central Europe.

If Italy should succeed in bringing about an alliance with Jugoslavia, thus willfully sharing with France the rôle of protector of the Little Entente, she might really alter the balance of power in Europe. Italy now has a population roughly equal to that of France. She is united, compact and determined. Under strong leadership she has recently come to an understanding with Spain. She is now a force to be reckoned with. If, in addition, she were to consolidate her position by becoming an ally of the Little Entente, she would be one of the great controlling factors in European politics.

GREECE

VENIZELOS HEADS GOVERNMENT.—The Revolutionary Committee headed by Colonel Plastiras, which had ruled Greece since the abdication of Constantine in the fall of 1922, turned over its powers to the newly elected

Constituent Assembly at its opening session on January 2. In his speech on this date Colonel Plastiras declared his personal preference that Greece should become a republic.

Former Premier Venizelos returned to Athens on January 3, and on January 11 consented to form a cabinet under his direct leadership. It was reported from Athens that M. Venizelos had taken effective steps to conciliate not only divergent factions in his own Liberal party, but also Royalist followers; and that he favored the determination of Greece's future government by a fair plebiscite supervised by representatives of both Royalist and Republican parties in each district. Popular sentiment in the towns was reported partly republican, and among the peasants strongly monarchist.

LEAGUE OF NATIONS

DRAFT OF NAVAL LIMITATIONS FOR ALL POWERS.—Geneva, December 30. (Associated Press.)—The naval sub-commission of the League of Nations, in connection with the two proposed conferences to secure world-wide extension of the principles of the Washington naval treaty, has framed a tentative convention laying down the capital ship limitations for the principal powers that did not sign the Washington accord. This draft, which is in the hands of the interested governments, will serve as a basis of discussion at the meeting of the naval experts of the powers, which the League is trying to convoke in a manner which will insure the presence of Russia.

The experts, in their turn, will pass on the results of their deliberations to the second and more general conference, which will be summoned subsequently. Article IV of Chapter I of the tentative convention declares that the total capital ship replacement tonnage shall not exceed in standard displacement the following for the various countries: Argentina, 81,000; Brazil, 45,000; Chile, 35,000; Denmark, 13,000; Greece, 36,000; the Netherlands, 26,000; Norway, 16,000; Spain, 81,000; Sweden, 62,000.

This article is followed by a note, explaining that Article IV was drafted in strict accordance with the principle of the *status quo* and adding:

"Nevertheless, a majority of the members of the naval sub-commission felt bound to call the attention of the Council of the League to the resulting inequality between the respective naval forces of the three South American States, Argentina, Brazil and Chile, whereas from a technical and general consideration of the circumstances of these States, they consider they should logically have equivalent naval forces, the total tonnage in capital ships remaining, however, below 80,000."

The official records of the League show that at the outset of the sub-commission's deliberations there existed a divergence of views concerning the principles on which the extension of the Washington Treaty to non-signatory States should be based. The majority, which consisted of the representatives of Great Britain, France, Italy and Japan, all of whom signed the Washington document, were of the opinion that in the absence of exact information regarding the special requirements of each of the States it was impossible to find a more practical basis of estimating the replacement tonnage than the *status quo* of November 12, 1921, which was the basis adopted at Washington.

The minority, namely, the representatives of Brazil and Spain, were of the opinion that the *status quo* was neither the most important nor the most acceptable basis proposed by the convention. They believed that this principle should be subordinated to the principle of the national

security of Brazil. The Spanish expert made personal reservations on the tonnage allocated to Spain.

In the face of this divergence the League attaches great importance to the forthcoming meeting of the experts. In the meantime the League is struggling with the problem of where to hold this conference. Its officials say that the League has nothing to do with the reasons for Russia's refusal to come to Switzerland; they deem this a political matter outside the domain of the League, whose sole object is to secure the presence of Russia, which is considered vital to the success of the conference. Hence the suggestions to convene elsewhere.

The idea of meeting in London has been followed by suggestions of Venice and Rome, and the various Governments are being sounded on this proposal.

Private, but not official discussions have been held as to whether the United States should be invited to the second General Conference. It is pointed out that the other great powers which signed the Washington treaty will be present, because they are members of the League, and the question has arisen as to whether the United States, as the only great naval power, should not be invited in the interest of the conference's success.

SUMMARY OF PEACE PLAN.—The award of the Bok Prize of $100,000 for the best plan for securing world peace was announced early in January. As summarized the plan contained the following points:

I. That the United States shall immediately enter the Permanent Court of International Justice under the conditions stated by Secretary Hughes and President Harding in February, 1923.

II. That without becoming a member of the League of Nations as at present constituted, the United States shall offer to extend its present co-operation with the League and participate in the work of the League *as a body of mutual counsel* under conditions which

1. Substitute moral force and public opinion for the military and economic force originally implied in Articles X and XVI.
2. Safeguard the Monroe Doctrine.
3. Accept the fact that the United States will assume no obligations under the Treaty of Versailles except by Act of Congress.
4. Propose that membership in the League should be opened to all nations.
5. Provide for the continuing development of international law.

UNITED STATES AND LATIN AMERICA

SALE OF ARMS TO OBREGON GOVERNMENT.—On January 4 the United States War Department formally announced the sale to Mexico of 5,000 Enfield rifles, model of 1917; 5,000,000 rounds of caliber thirty ammunition, and eight *DH-4* airplanes, terms of sale half cash and half in thirty days. The rifles and ammunition were in Texas and the airplanes at Fairfield Depot, Dayton, Ohio.

The de la Huerta revolutionary forces in Mexico, through their confidential agent in New York, on December 31 lodged a protest with the State Department against this sale as an interference in Mexico's internal affairs and as likely to disturb friendly feeling between the two countries. A resolution was also introduced in the U. S. House of Representatives opposing the sale as contrary to traditional American policy. The Ad-

ministration, however, went ahead with the transfer of war materials, justifying it as a practical means of assisting the recognized government in Mexico to establish peace and order.

EMBARGO ON ARMS TO REBELS.—President Coolidge on January 7 proclaimed an embargo on the shipment of arms or munitions of war by private concerns or others from the United States to Mexico. In effect the proclamation prevented only shipments to the de la Huerta faction, for specific exception was made of such exportations as were approved by the United States Government to the Government of Mexico, and such arms and munitions for industrial purposes as might be similarly approved.

UNITED STATES OPPOSES HUERTA BLOCKADE.—Following the declaration of a blockade of the port of Tampico on January 16 by the Mexican revolutionary forces, the United States Government through the American consul at Vera Cruz informed the rebel leaders that it would not recognize such a blockade and would take measures to prevent interference with legitimate American commerce. The U. S. light cruiser *Tacoma* was despatched to Tampico, and after her stranding on the Blanquilla reef, the scout cruiser *Richmond*, flag of Rear Admiral Magruder, with the *Omaha* and six destroyers was sent to the port.

On January 21 Secretary Hughes sent a sharp warning to the revolutionists against the placing of mines in any harbors controlled by the rebel faction, declaring that if such measures were executed at Frontera, Puerto Mexico, Vera Cruz, or at other ports, the United States Government "would be constrained to adopt appropriate measures to protect its commerce and its nationals from the grave and imminent danger involved."

FAR EAST

NON-PARTISAN CABINET UNDER KIYOURA.—On the morning of December 27 a bullet was fired at the Prince Regent of Japan while he was driving in an automobile to open the session of the Diet. The shot, fired by a Socialist fanatic, broke a window of the car but did no further injury. This attack was followed by the resignation of Home Minister Goto, who assumed responsibility, and later by the entire Yamamoto Cabinet.

A new nonpartisan Ministry was subsequently organized by Viscount Kiyoura, since 1922 President of the Privy Council. Viscount Kiyoura is a lawyer by training, has made a fortune in silk culture, and has a long and clean record in Japanese public life. Press reports from Japan indicated the possibility under his ministry of gratifying in some measure the growing agitation for universal suffrage.

BOOK REVIEWS

NAVAL OPERATIONS, Volume III. By Sir Julian Corbett. Longmans, Green and Co., London, 1923. $7.50.

A Review by Rear Admiral N. C. Twining, U. S. Navy, (Ret.)

This volume, the third in the history of British naval operations of the World War from the pen of the late Sir Julian Corbett, covers the period from May, 1915 to June, 1916, embracing the major part of the Dardanelles campaign, the early operations in Mesopotamia, the inception of the Salonica expedition, and, finally, the battle of Jutland. In addition to these outstanding features of the year of naval activity the German submarine offensive and the measures taken by the Allies to meet it take up no small portion of the volume, which also narrates events of scarcely less importance which were taking place contemporaneously in widely separated parts of the world.

All students of naval warfare must deplore the death of the distinguished author who, during his lifetime, contributed so much that is valuable to the fund of naval historical literature. The present volume was written in its entirety by Sir Julian Corbett who died only a few hours after completing the last chapter.

With respect to this volume, as in the case of those that have preceded it, a prefatory note by the Lords Commissioners of the Admiralty states that, while they have given the author access to official documents, they are in no way responsible for the production of the work nor for the accuracy of its statements. A further note, appearing for the first time in this volume, apprises the reader that, "Their Lordships find that some of the principles advocated in the book, especially the tendency to minimize the importance of seeking battle and of forcing it to a conclusion, are directly in conflict with their views." The significance of this statement in its bearing on the British tactics at Jutland will not escape the attention of the professional reader.

Professor Corbett's work is, of course, primarily a history of British naval operations; generally speaking the activities of the naval forces of the other allied powers enter into the narrative only when they were carried on in conjunction with those of the British Navy. The author, in the preface to the first volume, said that, "Although full use has been made of enemy and Allied sources of information so far as they were accessible, the work is based throughout on our own official documents, not only naval, but also military and political." The German Official Naval History, so far as published, has not yet reached the point at which the present volume of the Corbett history begins but the author has made use of the

material found in numerous semi-official or personal narratives many of which have been written by high officers concerned with particular operations or by statesmen and diplomatic officials who held positions of prominence during the war.

The vast number of "war books" that have been written by military, naval, and political participants in the war furnish material of unrivaled value for the historian. It is necessary, in reading these works, to bear constantly in mind the fact that many of them are essentially personal narratives the tendency, if not the actual or avowed object, of which is to exculpate the author from blame for any failures that may have been laid at his door. By intelligent reading and careful comparison the student will be able to form a correct idea of events and situations which, during the course of the war, were veiled by secrecy or obscured by partisan statements.

While the author of the present work has no personal considerations to sway him it must be borne in mind that he was a British author writing a history of British operations and having the British point of view. It is, perhaps, due to these facts that one looks in vain through the four hundred and odd pages of this volume for any criticism of the British policy or strategy or, with two or three inconspicuous exceptions, tactics. The dispassionate reader, and particularly the naval student, will not readily fall in with the steady march of explicit or implicit approval which leads from Gallipoli to Jutland; he will not be disposed to believe that the British were always right and the French always wrong when the two governments held divergent views as to important objectives; nor that the British views were always derived from broad considerations of policy and strategy while the French held the more constricted opinions imposed by considerations mainly domestic and national.

Sir Julian Corbett's work is, primarily, a history; the critical study of the naval operations of the war, which would have been so valuable coming from his able pen, is almost entirely lacking and such of it as is found is largely an elaborate and painstaking justification of some of the measures and acts concerning which naval professional opinion, in this country at least, is not in entire agreement with that of the author, and of which franker and less obviously justificatory discussion would have been welcome.

In the early spring of 1915, when the changes were made in the British Government which brought Mr. Balfour and Sir Henry Jackson to the Admiralty as successors to Mr. Churchill and Lord Fisher, the principal enterprises on foot which called for naval effort outside home waters were those directed to the conquest of the German African Colonies, the Mesopotamian expedition, and the operations at the Dardanelles. While the last named absorbed by far the greater part of the naval force abroad the others were of considerable importance and their history is full of professional interest.

In the operations against German Southwest Africa, the navy had no direct share for, as the author says, "Its part in them had been played at

the Falkland Islands, in the desolation of Tierra del Fuego, and the wide wastes of the Atlantic; but it was an essential part for what it gave to General Botha was the power to operate on widely separated lines the masterly combination which completely baffled the Germans and gave to the Union forces their rapid and well-deserved success."

In the Cameroons, Captain Fuller was aiding the army by making "diversions at various points on the coast with his marines and native levies" and was, at the same time, "stopping the flow of contraband from Fernando Po" by maintaining a blockade of some two hundred miles of coast.

On the East Coast there was but little military activity and the naval forces could devote the greater part of their energies to the purely naval task of destroying the *Konigsberg*, a task that was finally accomplished on July 11, 1915, by means of cruisers, monitors, and sea planes. For eight months this vessel had been inactive but, as the author says, "Such a position on the flank of our far eastern route could not be tolerated indefinitely"; in fact, in such a position one cruiser was potentially a great danger and the situation justified the magnitude of the effort that resulted in her destruction, an end which could and doubtless would have been accomplished much earlier but for the insatiable demand for naval vessels in home waters and other theaters of the war as well as the need for particular types not sooner available.

In Mesopotamia the navy played a part of most varied aspect and one withal so essential that without it the army could not have operated and the campaign must have been much restricted in its scope. Whether the project, in the form it finally assumed, was entirely well conceived or necessary as a part of the grand strategy of the Allies is a question which the reviewer of Corbett's work need not discuss; the author himself, perhaps through circumspection, perhaps because his theme is naval operations rather than the policy that shaped them, expresses no decided opinion on the point. Whatever the political exigencies may have demanded, it was the gradual development of the campaign from one of static protection of the oil fields and pipe line in southwest Persia and Arabistan into an active offensive against the Turks in the valley of the Tigris that afforded the navy its opportunities for close co-operation with the army, a service in which it acquitted itself with great distinction.

If no lessons in the broad fields of strategy and tactics are to be learned from a study of these naval operations and if the tale of them is less dramatic than that of the clash of fleets they are none the less of interest to the professional reader as showing how the education and training of a naval officer fit him to meet the most diverse situations and to solve unusual practical problems. Captain Wilfrid Nunn, who was the naval officer in command during the greater part of the time, had the "will to victory" highly developed; his motto was always "push on" and there were no such words as "can't" or "fail" in his lexicon. Whether making reconnaissances up unchartered rivers and creeks, conveying troops, engaging enemy craft, bombarding villages and entrenched camps, or forcing the surrender of

detachments of enemy troops, Captain Nunn and his subordinates were always zealously, competently, and successfully carrying out their mission and rendering invaluable aid to the land forces.

Of the capture of Amara, which marked the close of the first stage of the campaign, Sir Julian Corbett says, "The success was thus complete, and it was due not only to the audacity and alert resource in which the operation culminated, but in an equal degree to the skilful and patient staff work by which each service from first to last had made good the inabilities of the other, and to the close co-operation between them which, as General Nixon wrote in his despatch 'stands out as a marked feature of the operation.' "

In May, 1915, the general military situation was not favorable to the Allies; on the Western Front, while fierce fighting was in progress, the Allies were making no substantial gains; in the East the Russians were being swept back along their whole front; the political effect of the Russian reverses and of the Allies' failure to achieve substantial successes in France was to render less probable the entry of Bulgaria on the side of the Allies; the efforts of the Allies to induce her to declare against the Central Powers were meeting with no success. The first naval attacks in the Dardanelles had failed and the military successes had been limited to securing a precarious hold on the fringes of the Gallipoli Peninsula; hope of a success which should put Constantinople in the hands of the Allies and thus open up free communication between Russia and the Western Powers was dim unless a major effort were promptly undertaken at that point, an effort in which the necessary strength of army and navy should be exerted in unison and in full co-operation and co-ordination—a plan that had not yet been followed. For this lack of appreciation of the necessities of the case, as well as for the original failure to perceive the overmastering strategic importance to the Allies of holding the Dardanelles and the Bosporus, they were now paying dearly and the account was not yet closed.

The advent of enemy submarines at the Dardanelles early in the year, resulting in the loss of the *Triumph* and *Majestic*, forced the withdrawal of the heavy ships to Imbros and Mudros and the selection of the latter place, some sixty miles from the beaches, as a base for the discharge of transports and supply ships. The effect on the conduct of operations was immediate and grave; not only was the landing of troops and stores delayed but the enforced absence of the heavy ships substantially reduced the amount of protection to beaches and support of troops that the navy could offer. It cannot be denied that the offensive work of the submarines contributed largely to the ultimate failure of the Dardanelles enterprise. It is true that the terrain was unfavorable to protection against submarines and that there was a dearth of suitable vessels of anti-submarine types but, on the other hand, the enemy had but few submarines assigned to this particular work.

It cannot but be regretted that the task of opening the Dardanelles was not taken in hand with a juster appreciation of its magnitude and with

more maturely conceived plans for joint operations afloat and ashore. Professor Corbett does not overstate the case when he says: "With the failure of the original Expeditionary Force to seize the keys of the Dardanelles the whole outlook darkened. . . . There are probably few now who do not see in that narrow area where General Hamilton's little army clung exhausted to their trenches . . . . the decisive point of the war. . . . It was this venture so rightly aimed—but aimed without the energy of true faith—that had been at first scouted as a blind dissipation of force, as a mere eccentric operation."

Perhaps the overmastering importance of a success in this venture was now realized by the British Government but the steps necessary to make it a success were not taken. Instead, a compromise decision was reached; as the author puts it the decision was "to act on our time-honored system as strongly as possible without an open conflict of opinion with France. . . . The Dardanelles enterprise was to be carried on" but not as a major offensive into which was to be thrown the force necessary to insure success and the campaign dragged on to its conclusion in the evacuation of the Peninsula in December.

It was again demonstrated in this campaign that ships can dominate and silence shore batteries but cannot destroy them. The fleet could and did render assistance to the troops so valuable that it is not too much to say that it was indispensable; without it not only would the beaches have been untenable but the troops could neither have made such small gains as were realized from time to time nor, indeed, have maintained their positions. The naval student will be disposed to look with considerable favor on the plan for forcing the Straits proposed by Admiral Wemyss and Commodore Keyes which involved running by the forts at the Narrows and attacking them in reverse, cutting the enemy's communications, and providing for the maintenance of the fleet in the Sea of Marmora while leaving to the army its proper task of finally reducing the forts and consolidating the gains made by the navy.

It was not only at the actual scene of the fighting that the navy contributed its share to the combined operations; in the Straits, the Sea of Marmora, and the Bosporus British and French submarines operated with a high degree of success against the enemy's communications by land as well as by sea. They not only sank practically every Turkish craft afloat in those waters but were able to cut the land communications along the Bulair Isthmus and seriously hamper the flow of re-inforcements, stores, and munitions to the Peninsula. A whole volume might be written of the exploits and experiences of these boats under their skilful and intrepid commanders.

The history of the evacuation reflects unqualified credit on both services; the planning was perfect, the organization and execution superb; but it was not alone the perfection of plan and execution that brought about the happy result; there was also, as a major factor in the achievement, adherence to the maxim "never lose a wind," a fact which carries its own lesson to naval and military men.

The extent to which military operations and, indeed, political and strategical decisions, depended on the capacity of the navy for supporting them is nowhere more apparent than in the history of the several projects and campaigns in the eastern Mediterranean. The Dardanelles, Salonica, Mesopotamia, the defense of Egypt, all drew heavily upon the resources of the navy and merchant marine; not only was the question of transport a harassing one but the necessity for protection for transports created a demand for small, fast craft which the Admiralty was not always able to meet. From the White Sea, where Russia seemed unable to help herself, to the Aegean, where submarine attacks were always to be apprehended, demands for escort poured in while in home waters and the Atlantic the need for ample protection for vessels carrying troops, food, munitions, and bullion was constant and insistent. Neither policy nor strategy could always be the deciding factors when a project was under consideration; the problems of transport and protection were in the field of logistics which thus, at sea as on land, took on an importance not equalled in any previous war.

In home waters, the outstanding event of the year was the battle of Jutland but before that the British navy had been ceaselessly active, both offensively and defensively, against the elusive submarine, in mine laying, pursuit of enemy mine layers, operations against contraband trade, and in coastal work in support of the army. The idea prevalent in this country during the early years of the war that the Allies were operating entirely on the defensive at sea was very far from being justified by the facts. In February the War Committee explored the whole strategical situation, examining numerous tentative plans for offensive employment of the major naval forces in home waters. All of these plans were rejected as being impracticable and the decision, so far as the employment of the Grand Fleet was concerned, was "that the only possible course was to preserve the old expectant attitude, while persevering by every means in our power to goad the High Seas Fleet to expose itself in the open sea."

The author states, with respect to one project examined, "As for attempting to close the ports with mines, they were too easily removed on the coast, unless continually watched, and until the enemy main fleet was defeated this could not be done." As this seems to have been the opinion of the Admiralty it is not easily understood why, later, when the opportunity came for defeating the enemy main fleet, the preservation of the Grand Fleet should have been deemed of more importance than decisive defeat of the enemy.

While the danger of more or less successful German raids on the southerly part of the East Coast seems to have been appreciated at the time nothing was done in the way of a redistribution of naval forces. While a redistribution was discussed and tentatively planned it could not be put into effect at once owing to two very excellent reasons: first, no considerable units could be moved south without dangerously reducing the strength of the main fleet in the north and unfavorably affecting its tactical organization; secondly, no harbors south of Scapa were of suf-

ficient capacity or sufficiently defended to accommodate more large vessels than were already based in them. The War Committee, according to the author, felt that the risk of attack on the East Coast "was one to be run for the greater end. Indeed the acceptance of the risk was the only means in sight by which the greater end could be attained. Convinced that so long as we kept our fleet concentrated where it was a decisive action was out of the question, the Admiralty saw in the temptation to raid the only effective means of getting the enemy to expose himself." The reasoning is rather difficult to follow and has a decided *ex post facto* flavor.

While no large offensive project in home waters was deemed practicable vigorous offensives on a smaller scale in many different localities were unceasingly pursued. Commodore Tyrwhitt, at Harwich, was continually on the move, displaying in a pre-eminent degree the qualities of boldness, skill, tenacity, and leadership. Two raids on the Schleswig coast were made, in both of which the main objective was a Zeppelin base supposed at first to be at Hoyer on the coast but found to be at Tondern some distance inland. In each case the raid was made by sea planes transported in carriers and supported by light cruisers, destroyers, and mine layers. It is interesting to note that, of nine seaplanes put over by the carriers in the second expedition, only two were able to rise from the water and only one reached its objective. In this incident we may find some reason for caution in attributing to air craft all the effectiveness claimed for them by their enthusiastic advocates.

German mine laying by both surface vessels and submarines was constant during the year; it was in the early summer of 1915 that the new *UC* boats began their activities and imposed an additional burden on the already overworked British anti-submarine craft and mine sweepers. The British countered in several successful mine laying expeditions into the Heligoland Bight which were supported by light cruisers and destroyers and sometimes led to minor engagements with enemy vessels of similar types.

In the Baltic, British submarines did some valuable work, notably at the time of the German naval operations in the vicinity of the Gulf of Riga which were designed to assist the army in its attack on the Russian right. It is a matter of regret as well as some wonder that, in this rich field, the British submarine activities were not made more extensive.

Sir Julian Corbett gives a very clear and concise resumé of the controversies that were going on behind the veil of secrecy in the German State Councils with respect to the employment of submarines, the swaying of the Emperor between the Tirpitz plan of relentless submarine warfare as a means of quickly defeating Great Britain and the Bethmann-Hollweg counsel of moderation lest the United States be provoked to war. Little or nothing of these internal dissensions was known to the Allies at the time and, unfortunately, their statesmen and naval men as well were too ready to attribute the *Sussex* capitulation to German weakness in submarines and the supposed efficacy of the Allied counter-measures. Even

the "string" that Germany attached to the *Sussex* promise was not appraised at its true meaning for, nothwithstanding President Wilson's prompt rejoinder, the German undertaking to restrict submarine warfare stood as a conditional one; the condition, Germany, no more than Great Britain or ourselves, expected us to observe and it should have been plain to all that a resumption of unrestricted submarine warfare might be expected at such time as suited Germany's book.

Meanwhile the accession of Vice Admiral Scheer to the command of the German High Seas Fleet inaugurated a new policy with respect to the employment of the German naval forces and began the setting of the stage for Jutland. Admiral Scheer, reading correctly the signs of the times, realized that the navy must do something more than it had been doing with submarines to contribute to a German victory. The author thus interprets the German Admiral's thought: "By some means or other the British sea-power must be broken. In battle there lay no hope, for it was only under exceptionally advantageous conditions in their own prepared waters that it was possible to meet the Grand Fleet with success, and that was a chance it was vain to expect. The British people, he was sure, knew too well the security Admiral Jellicoe was giving them as he sat immovably on the ocean communications ever to throw it away by clamoring for a hazardous advance into German waters. But short of that he believed that with his increased forces much might be done to make them weary of the war, and he lost no time in bracing the fleet for the schemes that were teeming in his mind."

The raid on Lowestoft and Yarmouth on April 25 was one of the first fruits of the new policy. While the material results of this raid were not great it affected the general situation in two most important respects. In Germany it gave added weight to the contention that an unresricted submarine campaign was not the only means by which the navy could make itself felt as a weighty factor in the war and thus contributed in no small degree to the decision to yield to the United States on the submarine issue raised by the *Sussex* incident.

In England a result of the raid was to hasten a decision in the matter of a redistribution of the fleet. While Admiral Jellicoe was not yet content to have the plans put into effect in full and the harbors were not yet sufficiently protected, the Government decided that a partial execution of the plan must be immediately ordered. It thus came about that on the eve of Jutland, the squadron of *Queen Elizabeth's* was at Rosyth with two squadrons of the Battle Cruiser Fleet when tactical considerations alone would have placed it with the main fleet. The presence of Rear Admiral Hood's Third Battle Cruiser Squadron at Scapa was purely fortuitous and not a part of the plan of redistribution of the fleet.

The author's account of the Jutland battle is very clear and is abundantly illustrated by the admirable diagrams that accompany it. It would be beyond the scope of this review to undertake a critical study of the battle, a task for which, in any case, the reviewer disclaims competence. The author's attitude towards the British conduct of the battle is one of

practically complete approval; throughout his account there is but one note of reprehension; this is found in the narration of the circumstances leading to the loss of the *Defense* and *Warrior* of which the author says: "So ended the first bold, if ill-judged attempt at individual action by a squadron commander."

Two facts may be noted as having had an unfortunate effect on the British dispositions; the first of these is the erroneous estimate of position made by both the *Lion* and the *Iron Duke* at 2.00 P. M. on May 31. The errors were, unluckily, of opposite signs and amounted, by late afternoon, to some eleven miles in the aggregate. A considerable part of the very real difficulty experienced by Admiral Jellicoe in locating the enemy battleships and deciding on a suitable deployment flowed directly from the initial errors of the reported two o'clock positions.

The second fact is that of the almost total failure of the British communications. Important reports of position, contacts, and of character, bearing, and course of enemy vessels sighted or engaged were either not made at all or failed to get through in correct or intelligible form. In numerous cases they were not received at all. Although the unreliability of radio communication had been foreseen by the Commander-in-Chief and orders had been given for maintaining visual contacts through linking vessels so far as possible, conditions did not facilitate observance of them nor, in any case, does much effort seem to have been made to that end.

Nothwithstanding the precedent difficulties and perplexities, Admiral Jellicoe, shortly after 6:00 P. M., had his deployed main fleet squarely across the path of the advancing German fleet; he had it in the same position again at about 7:15 P. M. The Germans were fairly capped at battle ranges and in a position of overwhelming disadvantage, yet both times they escaped, damaged certainly, but without the loss of a single major unit, the later loss of the *Lutzow* being due rather to damage received earlier in the day. Whether Admiral Jellicoe's turn-away to avoid torpedoes at 7:20 was justified or not is a question upon which opinions may well differ; certainly the risk of closing was heavy but it would seem that, by electing not to take that risk, he lost his opportunity to annihilate the German fleet. The consequences of success at that juncture would have been far-reaching, for the German High Seas Fleet was the mainstay and support of the submarine campaign which then, and for two years more, threatened the Allies with defeat.

In reflecting upon this stage of the battle—and it was, for all significant purposes, the end of the battle—one cannot but wonder what the outcome would have been if Admiral Jellicoe had thought, with Farragut: "I have to take this place. The chances are that I shall lose some of my vessels by torpedoes or the guns of the enemy, but with some of my fleet afloat I shall eventually be successful. I cannot lose all. I will attack, regardless of consequences, and never turn back."

The author states that Admiral Jellicoe's plan of battle contemplated engaging the enemy at about 15,000 yards, the least range that was beyond

the effective torpedo range of the enemy capital ships: this by reason of the preponderance of gunfire in the British fleet and the superiority of the Germans in the number of submerged tubes. Tactically the soundness of the plan is obvious but it is a curious fact that, of fourteen British vessels sunk in the several phases of the battle, every one was sunk by gunfire while of eleven German vessels lost at least five owed their destruction in part if not wholly to torpedo hits.

For the German side, Admiral Scheer's narrative is the principal source of information and this is freely quoted from or drawn upon by the author. While Admiral Scheer doubtless had his difficulties they are not so fully brought out in the narrative. There seems to be little doubt that he was surprised by the contact with the full strength of the British fleet; his running directly into so perilous a situation cannot be otherwise explained. His measures to withdraw from it were boldly conceived and brilliantly executed but they could hardly have succeeded had the British tactics been bolder.

Of Admiral Scheer's second advance against the capping British fleet, the author rejects the Admiral's own explanation. His argument is not convincing. Notwithstanding the apparent rashness of the move the Admiral's explanation of it appears reasonable and, although his leading ships suffered heavily, none was lost and the Admiral's avowed object was accomplished.

Of Admiral Jellicoe's dispositions for the night the same can be said as of his retiring tactics during the main action: any judgment, to be sound, must be based on a more complete knowledge of all the circumstances, political and strategical as well as tactical, than we of this generation are likely to be vouchsafed. We can only say that the conditions seem to have been favorable for a night attack by destroyers and light cruisers which might easily have so damaged the enemy's main fleet that it would have been a sure prey on the following morning. Admiral Jellicoe had no such intention and the night engagements, although nearly as costly to the enemy as those of the day, were purely fortuitous.

To the numerous gallant actions of individual ships, squadrons, and flotillas the author pays the tribute that is their due. Whatever shall be the verdict of history on the battle of Jutland as a whole, whether it shall be adjudged a British or German tactical or strategical victory, there will be no disagreement as to the high spirit and courageous conduct of practically all forces engaged, a spirit and courage that were no less prevalent in the German forces than in the British.

Many professional readers will find much in Corbett's pages with which they will disagree; no student will or should accept ready-made conclusions; on a presentation of the facts he must base his own opinion. It would appear that the statement of facts as made by Sir Julian Corbett is, in all essential particulars, correct so far as it is possible to make it so on the basis of existing reports of the participants in the battle. In forming judgments the following remarks of Admiral Scheer in his account of the battle may well be pondered: "In judging the proceedings it must

be borne in mind that at sea a leader adapts his action to the events taking place around him . . . . a certain reticence should be observed in making definite assertions that a different movement would have been more successful. . . . A naval battle may be open to criticism as to why it happened thus, but anyone who asserted that it might have happened otherwise would be in danger of losing his case."

SECRETARY'S NOTES

Membership

Present Membership, 4307. Changes since last report: New members, 7. Resignations, 11. Deaths, 2. Members dropped, 23. Total Decrease, 27.

Membership and Subscriptions

There has been a certain amount of misunderstanding in some quarters regarding the change in subscription rates to the PROCEEDINGS, a notice of which has been published in these notes for a number of months. Membership in the Naval Institute, as heretofore, includes a subscription to the PROCEEDINGS, and the cost of membership (membership dues) remains unchanged. Regular membership is available only to officers of the Navy, Marine Corps, and civilian officers attached to the naval service. Associate membership is available only to officers in allied military services, or to persons in civilian life who are interested in "the advancement of professional, literary and scientific knowledge in the Navy," and only after application and election as such. Membership is entirely personal, and continues until resignation in writing has been received.

Subscription is available to any organization or person and is automatically discontinued at expiration. The subscription rate is $5.00 per year.

The special subscription rate of $3.50 per year is available only to members who wish to send gift subscriptions to their relatives or friends, in order to acquaint them with naval life and conditions. It is not available to societies, subscriptions for which must be at the regular rate.

1924 Dues

Dues for 1924 were payable on January 1st. Bills this year were sent out in December, enabling those who desired to resign to do so as of the first of the year, thus saving the sending of additional bills for one or two months of the new year. All who have not already paid the current dues are urged to do so promptly, as the clerical work involved in sending out repeated bills is very great.

Prize Essay Award, 1924

The Board of Control, having considered the articles submitted during the year 1923, has awarded "Honorable Mention," consisting of a cash prize of seventy-five dollars and a life membership in the Naval Institute to Commander Russell Willson, U. S. N., for his article, "Our Tactical Readiness for War," published in the April, 1923, issue. No "Naval Institute Prize" was awarded, the Board being of the opinion that no article was of sufficient merit as to justify that award.

Change in Rules for Prize Essay 1925

Prior to 1918, essays were specially submitted in competition for the "Naval Institute Prize," the names of the writers being in sealed envelopes which were not opened until after the prize winning essay had been chosen. The Board of Control feels that the change in method of awarding the prize made in 1918 has not brought about the results anticipated; and has lessened, rather than increased, the amount of competition. The Board has, therefore, decided to return to the former practice of awarding prizes, commencing next year. The conditions governing this contest are published elsewhere in this issue.

New Books

It is not always that a book prepared as a textbook is of value to the service at large. There are, however, instances where books are of as great value to officers in active service as to the midshipmen for whom they are prepared. There are now in preparation three books each of which seems to fulfill that characteristic, and to have particular value to the officer who is preparing for his examination for promotion. These books are: "Leadership," $1.65; "International Law," $2.00, and "Notes on Naval Communications," $1.30, postage prepaid. All of these books should be available by the time this issue appears. Those interested should make application without delay, as the editions are not large, and will, in all probability, soon be exhausted.

Comments and Criticism

The Editor has been particularly gratified by the kindly comments made about the Naval Institute PROCEEDINGS, in letters received. Needless to say, such comments are an incentive to better effort, stimulate interest, and result in improved morale to

all the Naval Institute staff. Comments and suggestions are always welcome, in order that the standard may be further improved, and that the PROCEEDINGS may be not only of interest to members, but helpful to the Service.

Articles The Institute desires articles of interest to all branches of the service, including the reserve force. Non-members as well as members may submit articles, and authors receive due compensation for articles published. Compact, well digested articles are more likely to be accepted for early publication. In accepting articles for publication, the Institute reserves the right to have such articles revised or rearranged, where necessary, in order to bring them up to the required standard of articles published in the PROCEEDINGS—the cost, if any, to be deducted from the compensation due the author.

Reprints of Articles Twenty copies of reprints are furnished authors free of charge Additonal copies to the number desired will be furnished at author's expense, provided request is made before going to press.

Discussions Discussion of articles published in the PROCEEDINGS is cordially invited. Discussions accepted for publication are paid for at approximately one-half the rate for original articles.

Book Reviews As soon as practicable after the publication of books on subjects of professional interest, the Institute aims to publish authoritative reviews of them.

Address of Members In the past, many errors have resulted from the habit of changing an officer's address as soon as his transfer orders are published in the papers. No change will be made in the future except upon receipt of the Navy Directory, or notification by the member concerned. Reliance upon the former method may, in extreme cases, mean a delay of almost four months.

To insure the prompt delivery of the PROCEEDINGS and other communications from the U. S. Naval Institute, it is essential

that members and subscribers *notify the Secretary and Treasurer without delay of every change of address.* No responsibility can be accepted for failure to receive the PROCEEDINGS, where members fail to comply with this rule. Changes of address should reach the Institute by the 25th of the month, to be effective for the issue of the PROCEEDINGS of the following month.

Coupons for Applications

For the convenience of members making application for membership or for subscription, or informing the Institute of changes of address, a number of blank forms will be found elsewhere in this issue. It is hoped that members will take full advantage of these in order to reduce clerical work of all concerned.

H. G. S. WALLACE,
Commander, U. S. Navy, Secretary and Treasurer.